January 1958

RAILWAY TRACK and STRUCTURES

A Simmons-Boardman ... TIME SAVER publication

TOUGH-

AS THEY MAKE 'EM-

THE IMPROVED FAIR
is plenty tough because it can take the abuse of creeping stresses year after year and still maintain the highest degree of efficiency.

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Division of Poor and Company

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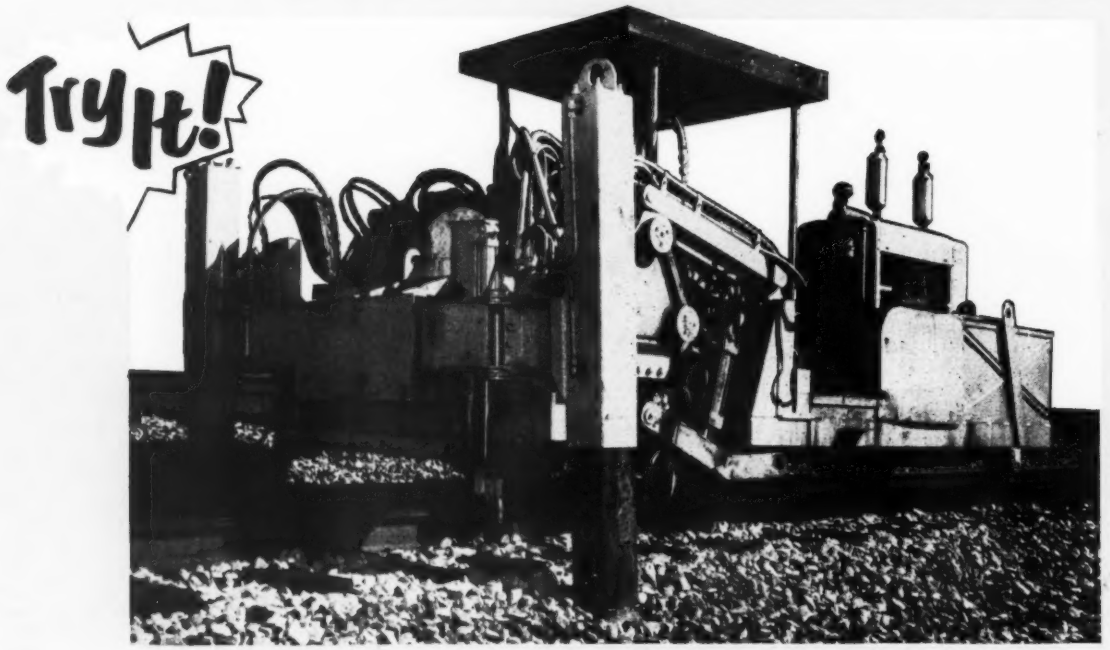

Maintain Surface on 75 to 150 Miles of Track a Year with the *Kershaw SPOT TAMPER*!

✔ CHECK THESE FEATURES:

- Tamps all classes of ballast including loose ballast, cemented ballast, dirt, cinders, chats, slag, gravel and crushed stone.
- May Be Used For Smoothing, Spot or Multiple Tamping
- Tamps Through Switches
- Tamping Bar Has Interchangeable Diamond Point Tamping Bits
- Tamping Bits Actually Go Under Tie
- Equipped With Hydraulic Jacks For Raising
- Completely Hydraulic Operated
- Equipped With Cross-Leveling Device

The Kershaw Spot Tamper combines the work load of a multiple tamper and a Jack-All to provide quick, efficient smoothing of low spots in track which has already been surfaced. This versatile machine, in addition to smoothing, also may be used as a spot tamper or a multiple tamper in your surfacing gang.

The Kershaw Spot Tamper is the only machine on the market which tamps through switches. It is equipped with hydraulic jacks for raising and will effectively tamp and raise track from zero to eight inches.

Tamping bits on the Kershaw Spot Tamper actually go under the tie. The four tamping heads provide complete versatility of operation since they may be used all four together, in pairs or individually.

Try the Kershaw Spot Tamper on your railroad. It's ideal for surfacing in classification yards and terminals as well as for any smoothing, spot or multiple tamping operation.

For a free demonstration of the Kershaw Spot Tamper on your railroad, contact any Kershaw representative, or write:

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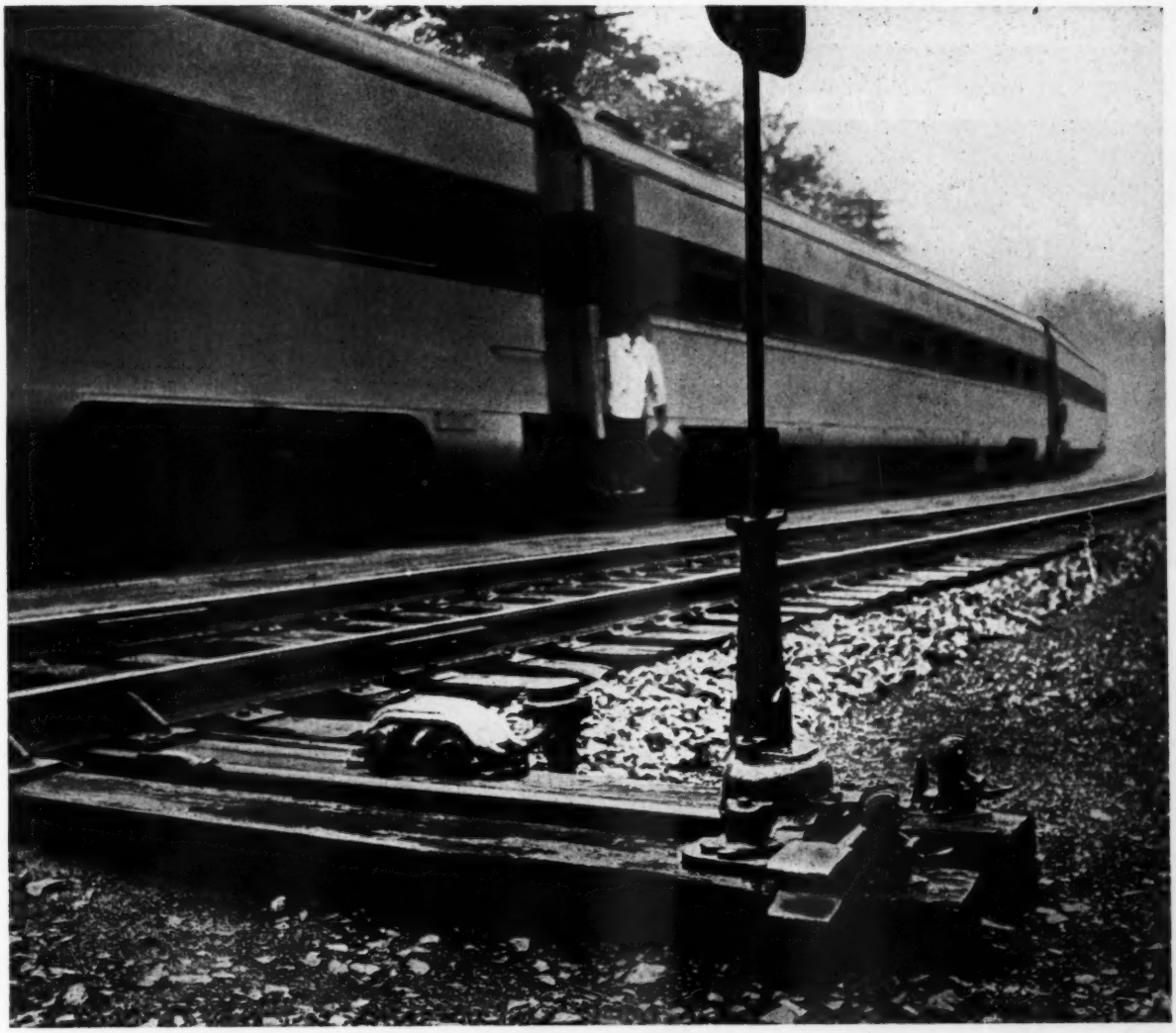
MANUFACTURING CO. INC
MONTGOMERY **ALABAMA**



How to get the most switch stand for your money

Switch stands look pretty much alike. But there is one stand which down through the years—more than 50 years, in fact—has given its owners more for their money than any other. That's Bethlehem's New Century switch stand.

The New Century's record for economy stretches far beyond its amazingly low initial cost. First comes the ease of switch point adjustment, which is a built-in feature of the stand itself. By simply removing or adding a shim or two, you can shorten or lengthen the throw—and it takes but a minute to do.

This adjustment feature, in turn, reduces wear on such switch fittings as throw rods and switch rods, resulting in longer life and further economy. And interchangeability of parts is important, too; when one part finally needs replacing, you'll find that new parts will fit the oldest New Centuries on your lines.

The New Century will outlast several switches, and can easily be moved from main line to yard or siding service. It can also be converted from intermediate to low and back again, according to the dictates of your operations. A Bethlehem engineer will gladly tell you about the New Century switch stand in full, and he can be reached through the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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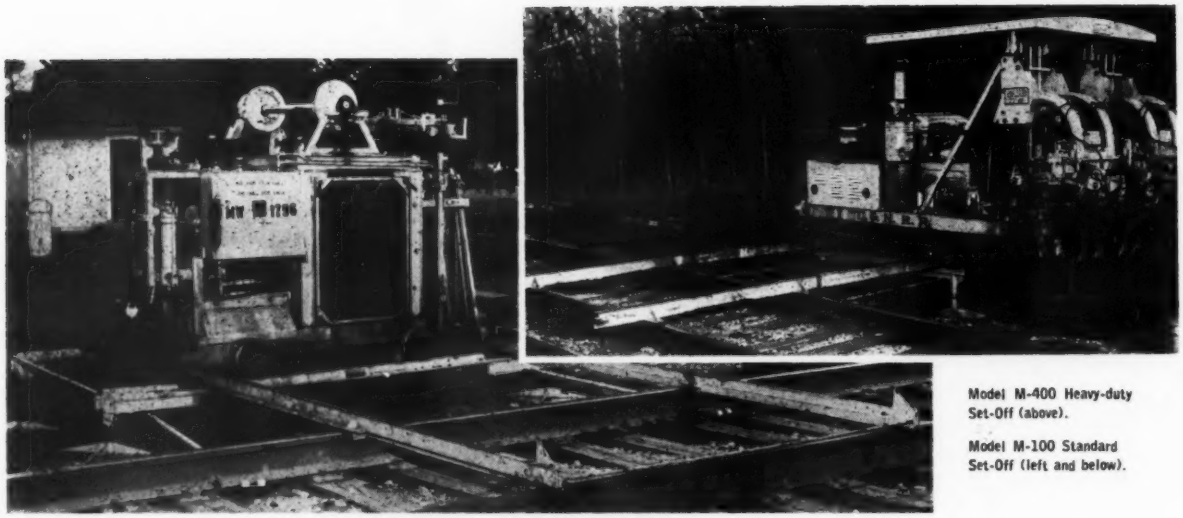
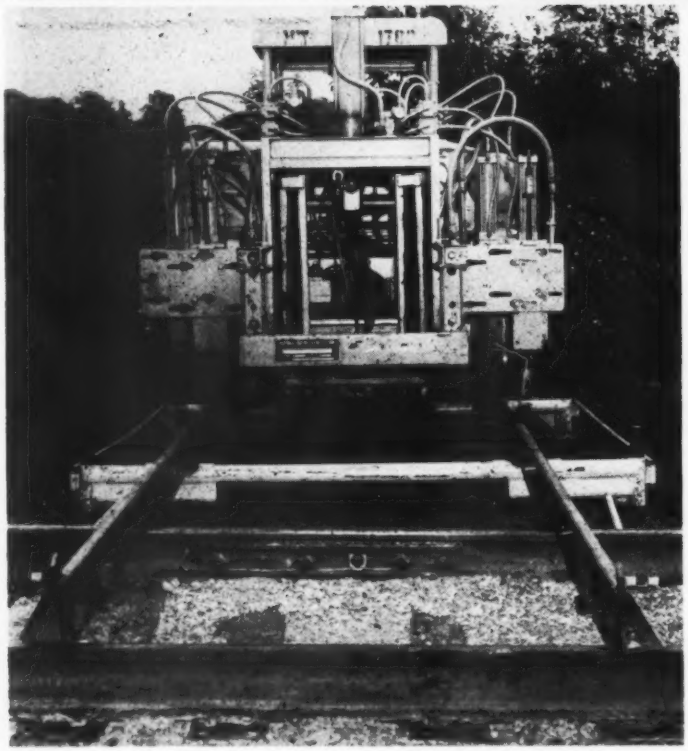


Model M-400 Heavy-duty Set-Off (above).

Model M-100 Standard Set-Off (left and below).



Adjustable Set-Offs

to handle all types of on-track M/W equipment

These two set-off units are designed for easy assembly by one or two men in a matter of minutes, and strongly built to stand hard usage. They permit quick removal of on-track equipment to clear rails for approaching trains with minimum loss of work time.

An important feature of the line is the use of two rail hook assemblies to anchor the set-offs to the rail, and space them the proper distance from track so that passing trains clear the machines which are set off. The firm anchorage to the rail eliminates shifting due to vibration from passing trains.

Run-off rails are welded to slidable saddles which permit sliding of run-off rails on front and rear beams. As these rails are not fixed, it is not necessary to spot the machine in exact position for setting off; running rails can be slid to engage wheels after machine has been jacked up and turned 90°, then it is lowered and run onto the set-off.

Disassembly is simple. Remove run-off rails; disconnect rail hook assemblies; remove tie bars. Front and back beam assemblies remain on pedestals as a unit. Only six pieces (not including run-off rails) to carry. One man can do it.

The models of T.P.C. Set-Offs shown here are just two of a line scaled to handle all types of M/W work equipment. They range in width from eight feet outward, to handle machines weighing up to 17,500 pounds, yet the heaviest set-off weighs only 560 pounds for easy and efficient handling.

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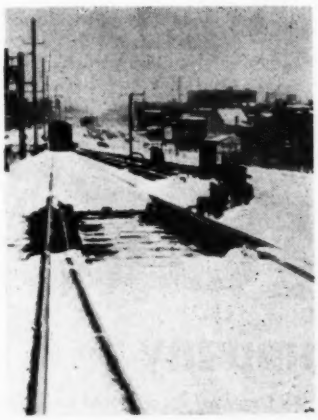

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DON'T MISS . . .

They're plowing track with a "team" on the Pennsylvania. The Pullman-Standard Winch Car and the Mannix Undertrack Plow have been teamed up to eliminate the expense of a work train. How does it work? "Fine," report PRR officers. Read about it . . .

. . . in the February issue

AJAX CUPS CAN HELP REDUCE ACCIDENT COSTS . . .

. . . CUT DOWN ABSENTEEISM . . . KEEP WORK ON SCHEDULE . . .

This drinking water service offers
3 BIG ADVANTAGES FOR TRACK MAINTENANCE GANGS

1 Whether to comply with the law – which in some states requires it – or simply to promote good employee relationships, many roads now supply clean fresh drinking water to maintenance gangs, by using AJAX Cups and equipment.

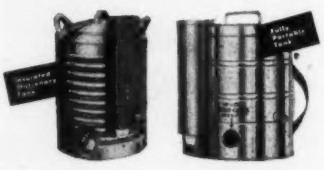
2 Crisp, clean AJAX Cups reduce the hazard of transmitted infections, thus reduce absenteeism, help keep important maintenance work on schedule.

3 Safety-imprinted AJAX Cups aid your accident-prevention program by putting safety messages right in your workers' hands several times daily . . . and safety messages *that get read* do help prevent accidents.

Developed out of long experience with railroad work, AJAX Complete Drinking Water Service is ideally suited to the needs of track maintenance gangs . . . actually works three ways to cut your operating costs.

Write today **for samples of imprinted Ajax Cups and new folder giving complete details on complete drinking water service.**

AJAX® CUPS – wedge-shaped, easy to hold–dispense open, ready to drink from; come in 4, 6 and 7 oz. sizes, imprinted with assorted stock safety messages at no extra cost – or your own message to order.



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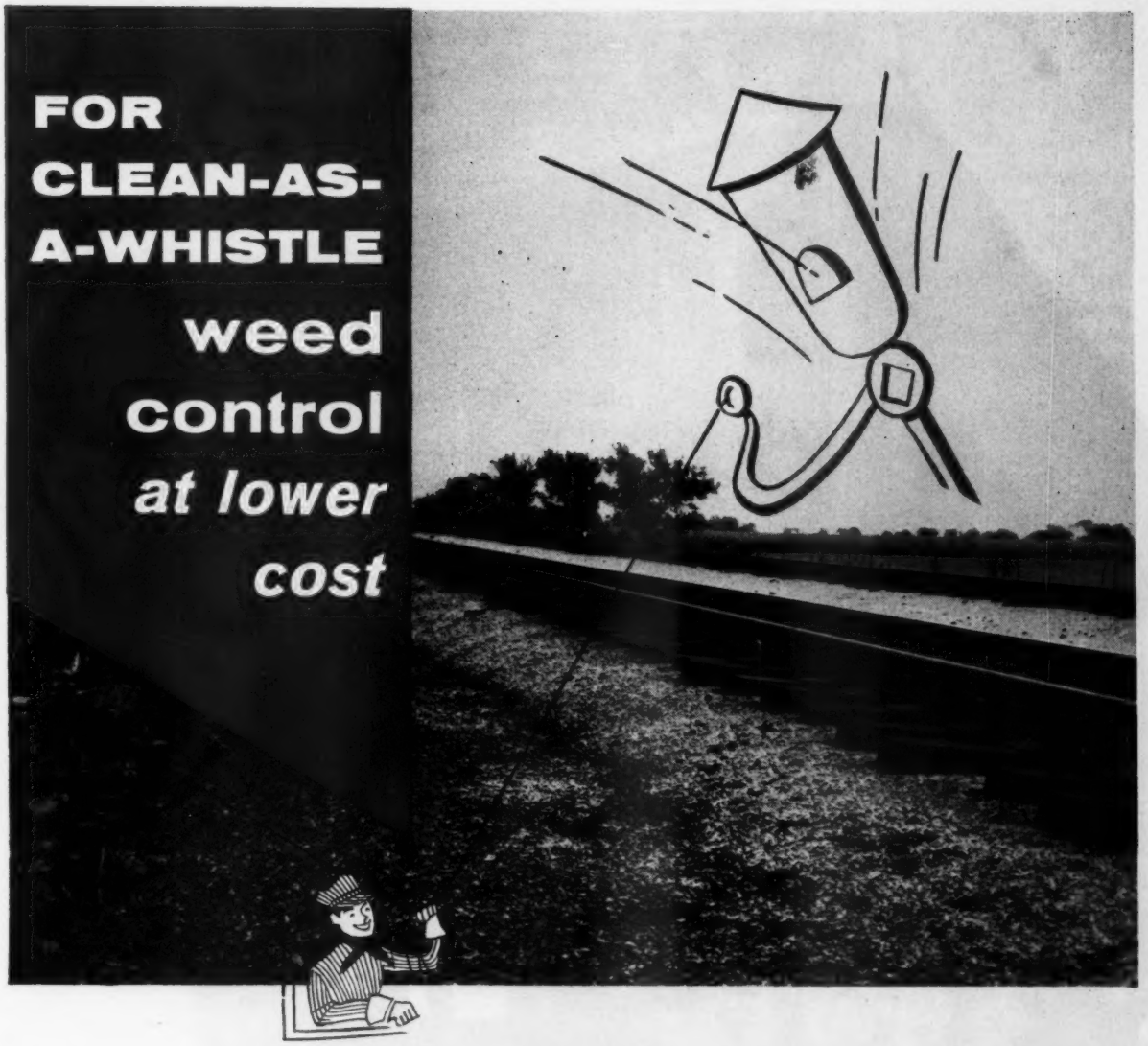

it's UROX* WEED KILLER

because...

- UROX is amazingly effective
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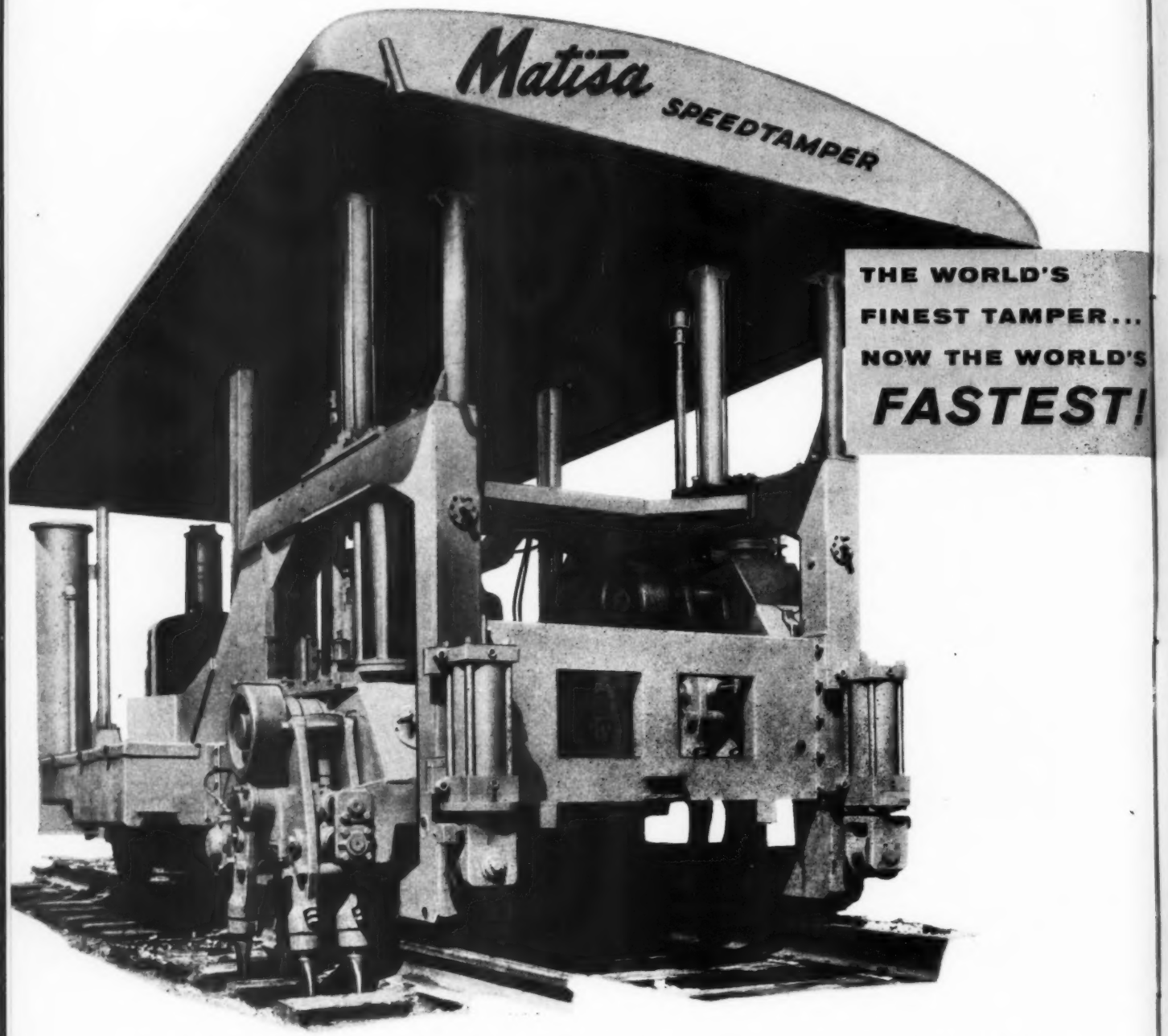

THE WORLD'S FINEST TAMPER... NOW THE WORLD'S *FASTEST!*

Here is the world's highest tamping efficiency

In dollars per foot of perfectly tamped track, the *Matisa Speedtamper* will give your M/W budget a real assist.

This machine retains the unbeatable Matisa principle of vibration-compaction tamping with the machine load always on tamped track, but now has many *PLUS* features:

Now hydraulically positioned tamping units for positive action, faster production. The *most efficient use of hydraulics has been applied throughout the machine.*

Now V-belt drives with multiple disc clutches — adds safety, cuts maintenance, eliminates gears and noise.

Now instantaneous split-head operation switches from speed surfacing to deep tamping without interruption.

Now pneumatic control valves with assured separate air supply from a small compressor on the diesel engine.

For details, write for the New *Matisa* Speedtamper brochure.

Lease and optional purchase plans available.

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News notes...

. . . a résumé of current events throughout the railroad world

TRACK and STRUCTURES

What's the outlook for '58?

Some predictions for the year were recently made by Dr. Burton N. Behling, AAR economist. Freight traffic, he predicts, may run 5 per cent under 1957 and 9 per cent under 1956. Passenger traffic, he estimates, will decline 5 per cent below the 1957 level and 12 per cent beneath the 1956 total. Railroad earnings, too, will be somewhat less, Dr. Behling predicts. The reason: A "persistence of inflationary cost trends for wages and materials."

•

What can be done about it? That's the question in all railroaders' minds. Senator Bricker (R-Ohio) supports general railroad thinking as he indicates a thorough study of transportation laws is called for. The last consideration given these laws by Congress, he points out, was in 1951.

•

Legislative action is considered by many to be the first step in the 1958 drive to improve the railroads' competitive position and earning ability. Hearings on "the deteriorating railroad situation and its effect on the national transportation picture" are scheduled to begin January 13 before the Surface Transportation Subcommittee of the Senate Committee on Interstate and Foreign Commerce. High in priority on the railroads' presentation: Complete repeal of transport taxes.

•

More efficient public relations is a much-needed commodity, according to some. ICC Chairman Owen Clarke says that railroad managements "hold the key to their future in the manner in which they handle their public relations. . . . The time for negative public relations, of the cry against unfair treatment . . . is passing."

•

Labor demands for higher wages will continue, it seems. T. C. Carroll, president of the Brotherhood of M/W Employees, speaking before the M/W Club of Chicago last month, indicated he doesn't think much of a recent proposal for a "wage freeze" to curb inflation. The BMWE is not seeking a guaranteed annual wage, he says. All they want, he explained, is to "be guaranteed 52 weeks of work opportunity."

•

A drive to cut unproductive expenses on all fronts is underway on an industry-wide scale. The North Western's campaign to drop unneeded one-man station services is gaining momentum with petitions now filed with the South Dakota and Minnesota commissions. Meanwhile, the B&O and NYC have been added to the roster of roads which have requests filed asking to drop unproductive train service. The B&O's petition: To drop all passenger service between Baltimore, Md., Wilmington, Del., Philadelphia and New York City.

•

Then there was this optimistic note from P&WV President R. N. Shields: "Unless business in 1958 should be far less than predicted by most forecasters, we should certainly do as well as we did in 1956. . . . As long as we can keep getting new industries on our lines we will not suffer much from a reduced traffic trend. . . ."

News about people

BANGOR & AROOSTOOK — Palmer H. Swales, division master mechanic at Oakfield, Me., has been appointed chief engineer with headquarters at Houlton, Me. Mr. Swales succeeds **Robley H. Morrison,** who resigned to become chief engineer of the Lake Superior & Ishpeming at Marquette, Mich. **O. Dale Anthony** has been appointed assistant engineer with headquarters at Houlton.

CANADIAN NATIONAL—J. L. Cann, district engineer on the Montreal district at Montreal, Que., has been appointed engineer maintenance of way, Central Region, with headquarters at Toronto, Ont., succeeding **F. W. Campbell,** deceased. **J. A. Des Troismaisons,** assistant terminal construction engineer, has been appointed district engineer at Montreal, succeeding Mr. Cann.

CHARLESTON & WESTERN CAROLINA—R. M. Collins, assistant engineer, has been appointed roadmaster with headquarters at Augusta, Ga.

CLINCHFIELD: The following appointments have been made at Erwin, Tenn.: **W. C. Hillman,** supervisor bridges and buildings; **J. C. Hobbs,** assistant supervisor B&B; **G. W. Hupp,** supervisor welding and work equipment; and **O. C. Harris,** assistant track supervisor. In addition, **B. C. Roberts** and **J. H. Evans** have been named track supervisors at Marion, N. C., and St. Paul, Va., respectively. The position of master carpenter has been abolished.

ERIE—Lewis M. Swoap, division engineer of the Terminal Division at Jersey City, N. J., has been promoted to assistant to engineer maintenance of way, Eastern district, at Jersey City. The position of division engineer, Terminal division, at Jersey City, has been abolished. **Arthur Price,** division engineer of the New York division, has been appointed division engineer, Terminal and New York divisions, at Jersey City, and **Edwin W. Scott,** assistant division engineer, New York division, has been named assistant division engineer, Terminal and New York divisions at Jersey City. The territory of **J. H. Duane,** track supervisor at Jersey City, has been extended to include the New Jersey and New York RR, the Northern RR, the Piermont Branch and the whole of the Greenwood Lake Branch. **Robert E. Ruby,** track supervisor at Hackensack, N. J., has retired after more than 50 years of service.

FRISCO—W. M. Davis has been appointed assistant roadmaster with headquarters at Thayer, Mo.

NORTH WESTERN—W. F. Armstrong, architectural engineer, has been named engineer of buildings at Chicago.

PENNSYLVANIA—A. S. Barr, district engineer at Baltimore, Md., has been named regional engineer, Northwestern region with headquarters at Chicago. Mr. Barr succeeds **Charles F. Parvin,** who has been promoted to engineer maintenance of way and structures at Philadelphia. Mr. Parvin succeeds **Donald E. Rudisill,** who has been named assistant chief engineer—maintenance at Philadelphia. Mr. Rudisill succeeds **L. E. Gingerich** who has been appointed chief mechanical officer, system. **Herbert O. Stratton,** track supervisor at Lancaster, Pa., has been appointed assistant district engineer at New York, succeeding **Joseph J. Baffa,** who has been named district engineer at Baltimore, Md., succeeding Mr. Barr. **T. T. Connelly,** supervisor of track at Buffalo, N. Y., has been transferred to Johnstown, Pa., succeeding **C. W. Owens,** who has been promoted to assistant district engineer at Harrisburg.

RICHMOND, FREDERICKSBURG & POTOMAC —Lawrence B. Cann, Jr., division engineer at Richmond, Va., has been promoted to chief engineer succeeding **James C. De Jarnette, Jr.,** deceased. **George P. Hayes, Jr.,** assistant engineer, has been promoted to engineer of construction, and **Charles E. Whitmore, Jr.,** supervisor of track on the Fredericksburg district, has been named assistant engineer of construction.

Mr. Cann, 38, attended public school at Richmond, and was graduated from the Virginia Military Institute in 1941. He served as a major in the U. S. Cavalry during World War II and entered the service of the RF&P as an engineer aide in February 1947. He was promoted to assistant supervisor in July 1949 and on December 1, 1950, was named supervisor. In February 1955, he was promoted to division engineer in which capacity he served until his recent promotion.

SEABOARD AIR LINE—B. R. Martin has been named assistant roadmaster on the Virginia division with headquarters at Raleigh, N. C. **W. S. McLendon,** assistant roadmaster at Atlanta, Ga., has been promoted to roadmaster at that location, succeeding **W. N. Winfree** who has retired after 50 years of service.

SOO LINE—Lawrence V. Johnson, chief engineer, has been promoted to general manager with headquarters at Minneapolis. **Thomas Klingel,** assistant chief engineer, maintenance of way, has been named chief engineer succeeding Mr. Johnson. **Raymond C. Postels,** division engineer at Enderlin, N. D., has been named assistant chief engineer, maintenance of way, succeeding Mr. Klingel.

SOUTHERN PACIFIC—John N. Cetinich, assistant division engineer at Los Angeles, Calif., has been promoted to senior assistant division engineer with headquarters at San Francisco.

Biographical briefs

James A. Peebles, 46, who was recently promoted to assistant to chief engineer—personnel and training on the Canadian National at Montreal, Que. (*RT&S,* Nov., p. 12), graduated from the University of Manitoba and began railroading on the CNR in January 1946 as an instrumentman in the water service department. After serving as assistant engineer in that department, he was appointed training supervisor—maintenance of way in March 1954—the position he held at the time of his recent promotion.

Thomas C. Herndon, who was recently promoted to engineer maintenance of way on the Charleston & Western Carolina at Augusta, Ga. (*RT&S,* Nov., p. 12), graduated from Georgia Tech in 1949 and served with the Georgia State Highway Department until January 1951 when he joined the C&WC where he was serving as roadmaster at the time of his recent promotion.

Stanley G. Phillips, 62, who was promoted to vice-president—engineering, of the Boston & Maine (*RT&S,* Oct., p. 26), graduated from the University of Maine and began railroading in 1917 with the Lehigh Valley as a levelman. He subsequently served with the LV as transitman, assistant engineer, assistant supervisor of track and supervisor of track until 1929 when he joined the Central of New Jersey as supervisor of track. He left the CofNJ later that same year to join the B&M as assistant division engineer at Bos-

(*Continued on page* 54)

L. B. Cann, Jr.
RF&P

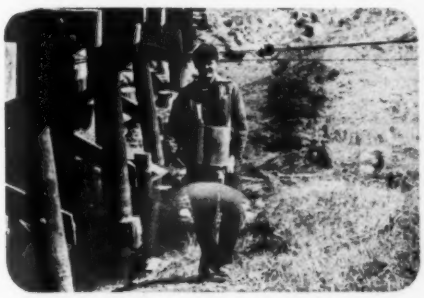
James A. Peebles
CNR

Thomas C. Herndon
C&WC

Stanley G. Phillips
B&M

LOOK..AT THIS EASIER, THRIFTIER WAY TO STOP WEEDS

COMPARE THE RATE—Enough UREABOR weed killer to treat 12 square feet is held in this hand! Consider the convenience and economy afforded by a rate of application as low as 1 lb. per 100 square feet of area.



COMPARE THE EASE—Applying UREABOR weed killer is as easy as walking! By actual test, one man spreading this granular material *dry* with the PCB Spreader can cover a given area in less time than can a two-man spray crew.

COMPARE THE RESULTS—The killing effect of UREABOR continues throughout a season or more! A single application can mean a weed-free surface. Roads from coast to coast are using UREABOR to get the lasting control it provides.

COMPARE THE COSTS—UREABOR kills weeds for pennies; saves you dollars! It is low priced... your initial outlay is small. Further economy comes from low rates of application, savings of man-hours, and convenience in handling and storage.

COMPARE... 20 MULE TEAM UREABOR® WEED and GRASS KILLER

The PCB Spreader applies Ureabor quickly and uniformly at low rates. It holds enough Ureabor to treat up to 2500 sq. ft. without refilling. Available for $10.75 delivered —anywhere in U.S.A.

UREABOR invites comparison with all other weed killers from any standpoint. What is your gauge of measurement? Is it EFFECTIVENESS? ...SAFETY? UREABOR is effective and safe in every respect. It is *nonflammable*, *noncorrosive* to ferrous metals, *nonpoisonous* when used as directed. No product is easier to apply... there is nothing to mix; no water to haul. Check all the advantages of UREABOR and you'll agree that it stands alone. Write for literature.

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PACIFIC COAST BORAX COMPANY DIVISION

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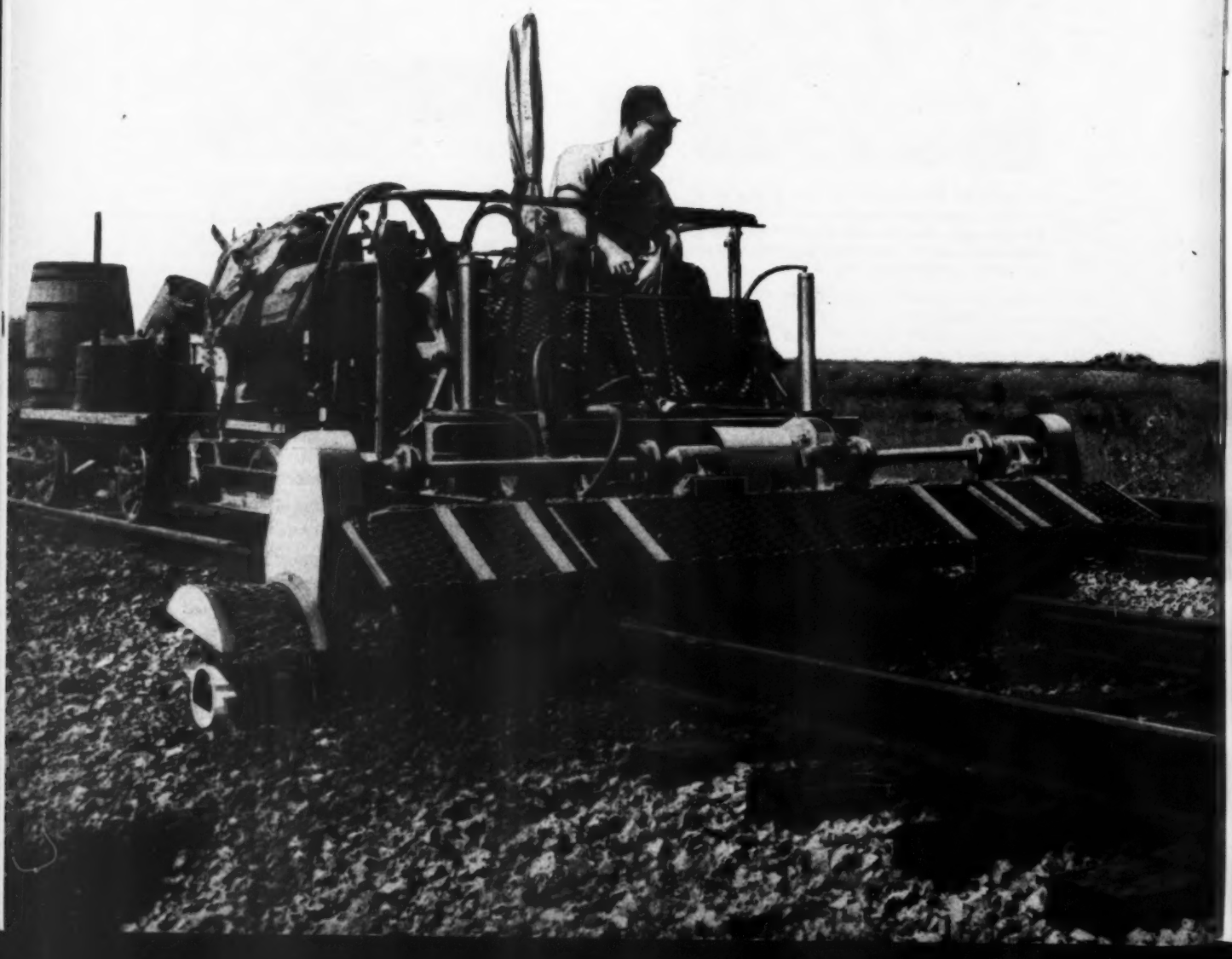
One man can do the work of fifteen with . . .

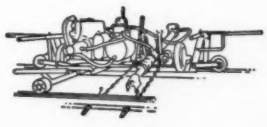


Fairmont

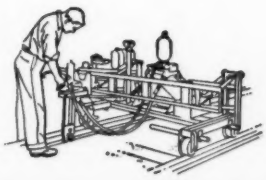
THE FAIRMONT W87 SERIES B TIE BED SCARIFIER (illustrated on the opposite page) provides a sure way to reduce tie renewal costs. The W87 can dig a tie bed ten feet long to a predetermined depth in a minute or less . . . *up to 800 hard, dry tie beds a day!* What's more, ties go in straight and properly spaced. How many men would you need with picks to equal that rate and quality of production? Plenty . . . and it's the reason why cost records everywhere show the W87 paying for itself—and even earning dividends—in just a few months. Modernize and mechanize *your* tie gangs with the Fairmont W87 Series B Tie Bed Scarifier!

Other Tie Renewal Equipment by Fairmont

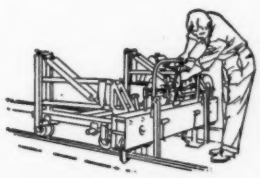
W90 SERIES A TIE HANDLER inserts or removes ties quickly and requires only two men for operation. Simple design and sound construction. Self-propelled. Two-way operation.



W68 SERIES A HYDRAULIC TIE REMOVER removes ties at an average rate of approximately one per minute. Ruggedly built with a minimum of moving parts. Requires only two-man operation.



W84 SERIES B HYDRAULIC SPIKE PULLER is primarily for use in tie gangs. Light in weight, it features a ball-and-socket-mounted pull assembly. Will pull from either rail without change-over.



W86 SERIES A HYDRAULIC RAIL LIFTER features a spring-counterbalanced lifting arm, welded steel supporting frame and a direct-driven hydraulic pump. Two-man track removal.

W83 SERIES B TIE NIPPER (not illustrated) features a simple linkage and lever which guarantee positive opening and closing of hooks. The handle can be placed in three different positions.

FAIRMONT
RAILWAY MOTORS, INCORPORATED
FAIRMONT, MINNESOTA

MANUFACTURERS OF BALLAST MAINTENANCE CARS, DERRICK CARS, OIL SPRAY CARS, GROUTING OUTFITS, TIE RENEWAL EQUIPMENT, RAIL RENEWAL EQUIPMENT, WEED CONTROL EQUIPMENT, HY-RAIL CARS, TRACK MOTOR CARS, PUSH CARS AND TRAILERS.

Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

WATERPROOFING. A 16-page, two-color booklet has recently been made available describing the manufacturer's Waterplug, Thoroseal and Quickseal waterproofing products for building applications. The booklet, designated Circular No. 17, is illustrated with on-the-job photographs and contains complete specifications for these and other products of the Thoro system. (Write: *Standard Dry Wall Products, Inc., Dept. RTS, Box No. X, New Eagle, Pa.*)

WATER COOLERS. A two-page data sheet has recently been issued describing the Igloo water cooler. The manufacturer's complete line of coolers, from 2 to 15 gal capacity, is described and a cutaway view and accompanying text point out the advantages of the coolers. (Write: *Bettis Corporation, Dept. RTS, P.O. Drawer 9356, Houston 11, Tex.)*

STEEL BUILDINGS. A revised edition of "Armco Steel Buildings" has been issued by the manufacturer covering four types of buildings featuring the Steelox panel method of construction. Condensed data are given, and the bulletin contains drawings and photographs that illustrate the various points. The bulletin is designated SX-11557. (Write: *Armco Drainage & Metal Products, Inc., Product Information Service, Dept. RTS, Middletown, Ohio.*)

SCRAPERS. Reduction of earthmoving costs through the use of modern equipment design is the subject of a new booklet, entitled "Cat Lowbowl Scrapers Keep Costs Low," recently released. The booklet contains on-the-job reports and photographs collected through two years of operation and explains the details of the scrapers' advanced design. (Write: *Advertising Division, Caterpillar Tractor Co., Dept. RTS, Peoria, Ill.*)

POWER UNITS. A new, graphically-illustrated 12-page catalog on the manufacturer's line of six new and increased horsepower six-cylinder carbureted power units has just been announced. The booklet devotes a page of space to each of the six recently-introduced units and includes handy power and fuel consumption curves. Cutaway views of components spotlight various advantages of the units, and two pages are reserved for brief specifications, disclosing performances on gasoline, LPG or natural gas. The catalog is designated CR-511-G. (Write: *Construction Equipment Division, International Harvester Co., Dept. RTS, 180 N. Michigan Ave., Chicago 1, Ill.*)

BRIDGE CONCRETING. A 16-page booklet has recently been published containing the case histories of some 280 bridges which presented problems with regard to concreting. These case histories are covered in five separate articles, dramatically illustrated by photographs. The articles cover concreting of piers and bridge decks for highway and railway bridges and include discussions of hot and cold weather concreting, the use of lightweight aggregates in bridge work, and placing and finishing problems encountered in bridge work. The booklet is designated MBR-P-11. (Write: *The Master Builders Company, Dept. RTS, 7016 Euclid Avenue, Cleveland 3, Ohio.*)

PAINTING. Correct painting procedures for maintenance-of-way structures and equipment is the subject of a new brochure recently issued. In ready-reference chart form, the booklet spells out recommended materials for both new and previously painted surfaces of bridges, storage tanks, signal equipment, mobile work equipment and miscellaneous steel items. The importance of proper surface preparation is discussed, and specific techniques for preparing steel, aluminum, galvanized and galvannealed metal surfaces for painting are outlined. (Write: *Transportation Division, The Sherwin-Williams Co., Dept. RTS, Cleveland 1, Ohio.)*

Snow-Free Switches

with the RACOR SNOW-BLOWER

The Racor® Snow-Blower is the easiest, safest, fastest, and most economical way to clear snow from the spaces between switch points and stock rails.

Because the Racor Snow-Blower relieves the need for manual attention in bad weather, it saves many hours of labor and many dollars of expense. It's simple to install, easy to maintain, economical to operate.

How the Snow-Blower Works

The Racor Snow-Blower is designed to keep switches clear of snow by intermittent blasts of compressed air. Simple in construction, it consists of a source of compressed air, an air filter, an anti-freeze injector, a cycling device, an air valve and two manifolds equipped with adjustable nozzles.

The compressed air can be supplied from a small compressor for a single switch, from a larger compressor with sufficient capacity to serve several switches, or from a central air supply. The manifolds attached to the stock rails cannot interfere with the switch points.

Compressed air passes through the filter, anti-freeze injector, cycling device and then through connecting pipes into the manifolds. The air speed created by the manifold jets, approximately sixty miles an hour, removes snow and dirt from the opening between the switch points and the stock rails.

The blowing cycle can be varied within certain limits, but the usual cycle develops a blowing time of about four seconds in thirty-six seconds. This timing was found to be adequate to keep a switch clear of snow during a total snowfall of 64½ inches in six days, with an air supply of approximately 100 p.s.i.

Compare These Advantages

The Racor Snow-Blower has many advantages, the more important being: Extremely low operating costs—by far the lowest of any other snow removal method. No melted

snow; hence no problem of drainage or icing, or necessity of removal of ice formed from melted snow. No flame to blow out from high winds or passing trains. No danger of fire as a result of leaking oil from tank cars or from diesel engines that might stop over switch. No chance to burn up ties or insulation. If desired, the Racor Snow-Blower can be operated by remote control.

Dirt and sand, which might be carried into the switch with snow, are blown out and not left as a residue, as is often the case when snow is melted through heating methods. The introduction of alcohol in atomized form through the anti-freeze injector, combined with the effect of blowing dry compressed air, has proved very effective during sleet and freezing rain conditions.

Safety is perhaps the most important advantage of all, as employees are not required to manually clear switches under traffic during blinding snowstorms.

The Racor Snow-Blower has been field-tested and proven during five winters under extreme snow conditions. Let your Racor engineer help you put it to use next winter!

A-8107

AMERICAN
Brake Shoe
COMPANY

RAILROAD PRODUCTS DIVISION

230 PARK AVENUE • NEW YORK 36, N. Y.

IN CANADA: DOMINION BRAKE SHOE COMPANY, LTD.

LEADER IN PRODUCTS
RPI
MEMBER

Dear reader:

RAILWAY TRACK and STRUCTURES

The time has come to take the offensive

Maintenance-of-way officers are faced with a serious problem. It has been with them a long time, so long, in fact, that many of them have come to accept it as a permanent aspect of the conditions under which they work. In other words they tend to regard it as something they are helpless to change or abolish. We don't know that the problem can be solved; what we do know is that it will never be solved unless a determined attempt is made to do so.

The problem is the requirement that train service personnel be present on track-mounted equipment used in maintenance-of-way work. Such requirements vary rather widely depending on the union agreements in force on individual railroads. Nevertheless, the problem is a serious one on every railroad and imposes a severe obstacle to the economical operation of track-mounted equipment. In most cases the train service men assigned to M/W equipment serve no useful purpose, and the wages paid to them are sheer economic waste.

At a time when most M/W officers are struggling along with allotments that are inadequate to do the work they consider necessary, it is shameful that part of their funds must be diverted for uneconomic purposes. In view of this situation one might expect that M/W men would be on the offensive in an effort to correct the situation. The truth is, however, that they appear in general to be more on the defensive than ever for fear that present agreements may be extended to include additional types of equipment.

Efforts to solve the problem have, for the most part, been confined to the development of equipment that does not operate on the rails. Perhaps these efforts will meet with some measure of success. But what about the many types of highly efficient and productive on-track machines that are now in use? Can nothing be done to alleviate the burden imposed on their operation by the necessity of paying wages where no useful work is performed?

The answer to this question will not be known unless a concerted attempt is made to lift the burden. If an answer is to be had, the defensive position must be abandoned in favor of offensive tactics.

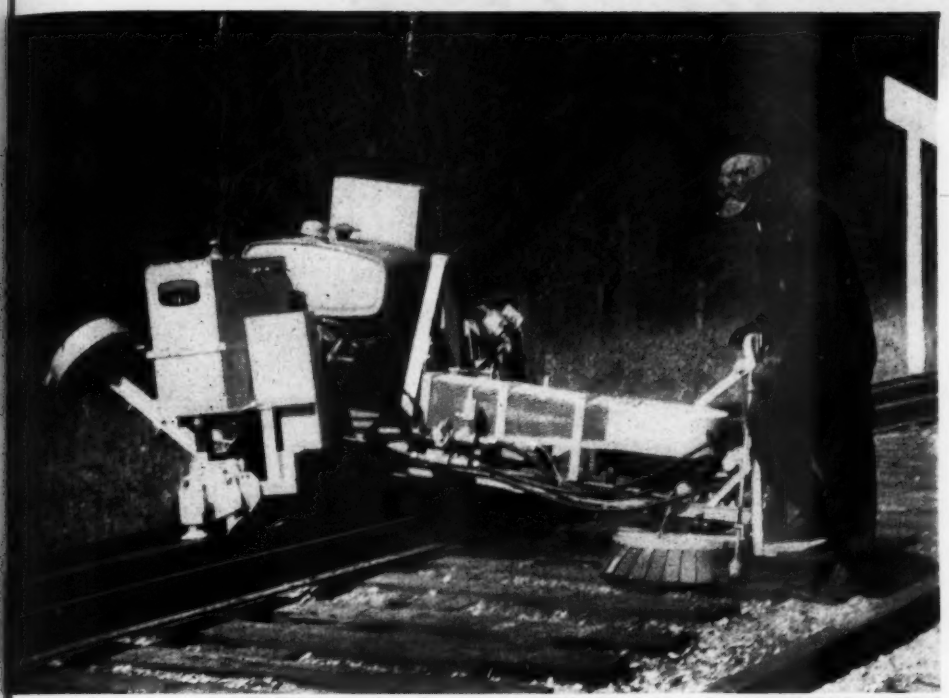
But, the M/W man will ask, what can I do? There is only one thing for him to do and that is to take his case to the management of his road. Since he has been given the responsibility of maintaining the properties economically, it is part of his job to insist that action be taken to remove obstacles that keep him from fulfilling this responsibility. And he must be prepared to keep hammering away at the subject, realizing that a problem of such long standing is not going to be solved quickly or easily.

There are indications that the railroads, long hampered by many artificial restraints, are beginning to test their chains. They are doing this collectively and individually. A few railroads, in a determined fight against unfair and uneconomic rules and regulations, have scored important gains. "Featherbedding" as it applies to on-track work equipment should be made a part of the battle. By insisting that this be done M/W officers have nothing to lose and everything to gain.

MHD

NOW... SELF-PROPULSION

adds to efficiency of NORDBERG ADZER and SPIKE PULLER



Cut Adzing Costs with Self-Propelled Adzer*

With self-propulsion, the well-known Nordberg Adzing Machine now becomes a *one-man* machine with greater power, to speed tie adzing. *Four* big features are now combined in the new Model CZ Adzer, to cut adzing costs:

(1) *Self-propulsion* . . . eliminates need for second man to move machine; (2) *Increased power* . . . 36 hp air-cooled engine delivers more power to cutter heads; (3) *Power feed* . . . provides for force feeding into ties—with maximum cutter bit efficiency; (4) *Patented bits* . . . new bit design increases service life at least 300%.

WRITE FOR BULLETIN 276

Increase production with Self- Propelled Spike Puller*

Here is another well-known Nordberg "*Mechanical Muscle*"® made even better . . . the Self-Propelled Spike Puller. Incorporating all the proved advantages of the regular Nordberg Mechanical Spike Puller, the new Self-Propelled unit now becomes a *two-man machine that boosts man-hour production 50%*. Utilizing a hydraulic pump and motor, the propulsion unit is "finger-tip" controlled by the operator for precise forward or reverse motion.

Write for complete details covering the New Nordberg Self-Propelled Spike Puller and the Self-Propelled Adzer.

Both of these NORDBERG Machines are also available without self-propulsion, if desired.

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NORDBERG *Mechanical Muscles*®

NORDBERG MFG. CO.

Milwaukee, Wis.

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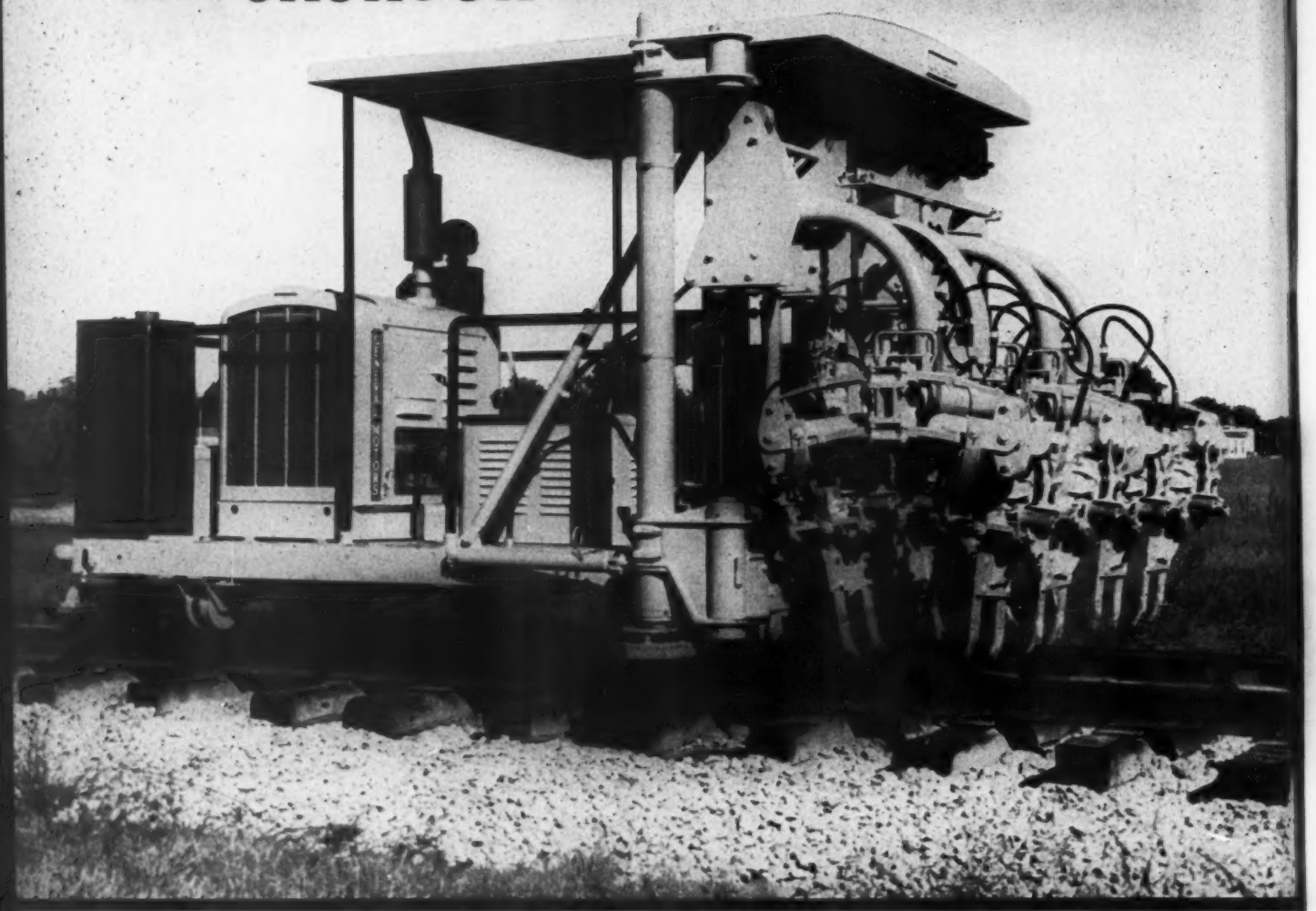
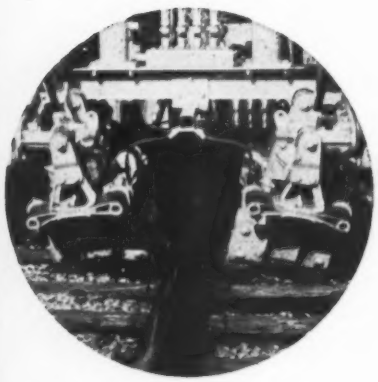
8457

THE JACKSON TRACK MAINTAINER





Note the direction of the tamping bars which assures perfect consolidation of the ballast in the vital load-bearing zone directly beneath the rail.

Only the Best is good enough!

Anything less in tamping equipment means higher than necessary production costs . . . greater frequency of recurrent costs, and track less resilient and smooth-riding than it might be.

✓ *Check these facts:* **THE JACKSON TRACK MAINTAINER is the only machine in its category that provides maximum ballast compaction uniformly under each tie . . . and concentrated directly under the rail . . . a homogeneously consolidated tie bed that runs continuously from the outer end of the tie to the specified distance inside the rail. Only a JACKSON TRACK MAINTAINER, with its powerful, high frequency vibration can produce such a large area, long-lasting track bearing in any lift from 0 to highest practical limits, and in ballast of any size or condition! These FACTS, confirmed by users of a great majority of the leading roads, account for the tremendous preference shown for this machine.**

✓ **HYDRAULIC LIFTING JACKS, as shown above, are now available as an accessory to the 1958 JACKSON TRACK MAINTAINER for efficient spot tamping at unprecedented low cost. This accessory, in complete kit form, is also available for 1957 and earlier models. Write or phone for complete details.**

JACKSON VIBRATORS, INC., LUDINGTON, MICHIGAN

Still going up . . .

'57 equipment buying sets record

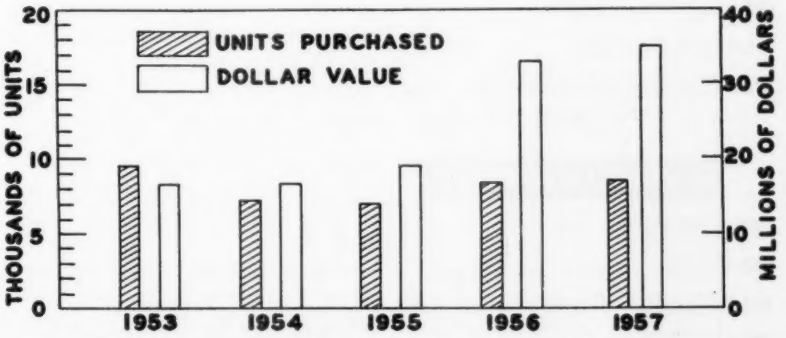
Expenditures for M/W equipment last year inched up to a new high of $35.2 million, $2.1 million above the record set in 1956. The number of units purchased was 8,480, highest since 1953. Higher outlay expected this year.

• The year 1957 was a good one for suppliers of M/W work equipment. With wages of M/W employees at an all-time high, railroads spent an estimated $35.2 million—more than ever before—for equipment needed for increasing the production of these employees. This compares with $33.1 million similarly spent in 1956. What is more important at the present time is that the railroads as a whole expect to hike these expenditures to an even higher level in 1958.

These statements are based on information obtained from a questionnaire sent out by this magazine to 440 railroads in the United States, Canada and Mexico. Replies were received from 307 roads, including all but five Class I carriers.

The replies received report that 8,392 units of work equipment were purchased in 1957. With this figure as a base, it is estimated that the railroads as a whole purchased 8,480 units of work equipment last year. This compares with 8,300 units purchased in 1956.

The reported unit cost of work equipment purchased likewise has gone up. In fact, cost per unit of equipment bought last year was the highest on record. This is explained by the fact that more machines of the larger and more expensive types were bought, such as both crawler and highway cranes, tractors and accessories, and production tampers.



MORE UNITS of work equipment, higher unit costs and more of the higher-priced units have raised the annual expenditure for M/W machines to the highest level on record. Current railroad reports indicate even greater expenditures for 1958.

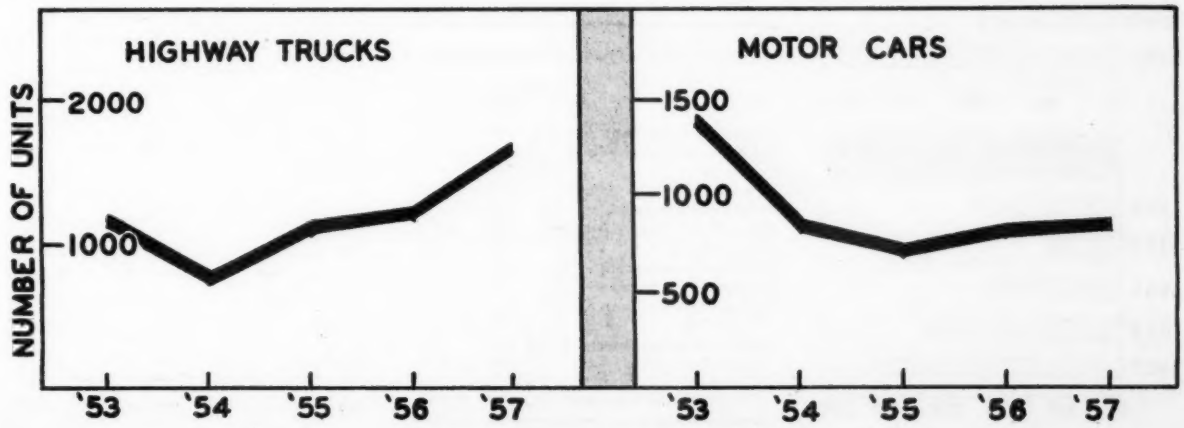
More in 1958

Not all reporting roads showed their anticipated expenditures for M/W equipment in 1958. But, of the 85 roads that did, 39 stated they would spend more this year, 42 stated they would spend less and 4 that they would spend amounts equal to 1957.

However, the sums reported by the 85 roads indicate that M/W equipment expenditures will be even greater in 1958 and will set a new high. In 1957, the 85 roads reported spending $16.7 million; in 1958 they plan to spend $16.9 million. This represents an increase of about 1.3 per cent which, when applied to the railroads as a whole, indicates an expenditure of $35.5 million in 1958.

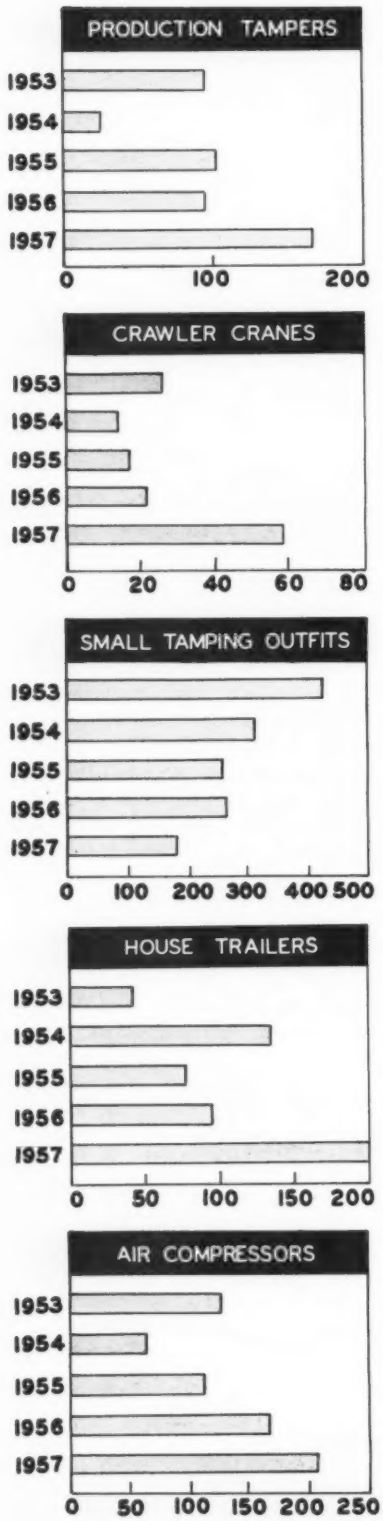
Information is not available indicating how much of the purchases will be for replacement purposes and how much for additional units. Nor does it show the types of work equipment being considered for purchase this year.

The reported purchases of work equipment in 1957 have been segregated into 11 major categories and are shown in the accompanying table. Five of these categories—



Purchases of five types of equipment . . .

(Bars show units bought)



cranes, grading equipment, transportation of men and materials, weed control and unclassified items—show increases in purchases over the preceding year. The largest numerical gain occurred in equipment for the transportation of men and materials, which includes passenger automobiles, trucks, motor cars, push cars and trailers. Although more motor cars were bought in 1957 than in 1956, the principal reason for the gain in this category can be attributed to the 1,650 trucks purchased.

The increase in the weed-control category was caused primarily by a sharp increase in the number of brush cutters and brush saws purchased. On the other hand there was a small drop in the number of weed mowers purchased, an item which forms the bulk of this category.

The "unclassified items" category shows a gain over the preceding year partly because the purchases of camp and house trailers were included in this category for the first time. These had previously been included in "miscellaneous track machines."

More production tampers

Although "ballasting equipment" shows a decrease in units purchased in 1957 as compared with the preceding year, a larger number of production tampers were purchased in 1957. On the other hand purchases of the smaller tamping outfits showed a decline.

Purchases of tamping jacks were triple the number bought in 1956. The number of track-lining machines held steady in 1957. Types of new equipment included in "ballasting equipment" for the first time are wire surfacers and lining devices and foreman's sighting cars.

Purchases of work equipment

	Number of units	
	1956	1957
Ballasting equipment	853	790
Bridge & building tools & equipment	540	441
Cranes	82	145
Grading equipment	325	365
Miscellaneous track machines	798	480
Power plants	498	353
Rail-laying equipment	898	733
Tie-renewal equipment	360	176
Transportation of men & materials	3,293	4,147
Weed-control equipment	157	212
Unclassified items	390	550
Total units reported	8,194	8,392

Tie-renewal equipment purchases slipped in 1957 as compared with the preceding year. However, since purchases of this equipment were the highest of record in 1956 and occurred in a year when a large number of new such machines were available for this purpose, it can be conjectured that many roads seized the opportunity of mechanizing this operation in 1956. Now that this machinery has proved up to expectations, several other large roads have indicated that they are contemplating the mechanization of tie renewals in 1958. This could conceivably result in an increase in the number of units in this category.

Purchases of rail-laying equipment were less in 1957 than in 1956. The only items in this category which showed increases were adzing machines and rail and bonding drills. However, substantial purchases of bolting machines and rail saws were made in 1957.

Under miscellaneous track machines, the number of rail-grinding units bought in 1957 more than doubled the 1956 purchases.

Grading units are up

Purchases of all major grading-equipment items showed increases in 1957. Both the crawler and wheel-type tractors, as well as their accessories, showed substantial increases. Dragline and clamshell buckets likewise showed considerable gains over the year before, and motor graders were also up.

In 1957 the crawler cranes purchased were almost triple the number acquired in 1956. Wheel-type cranes also showed a considerable increase.

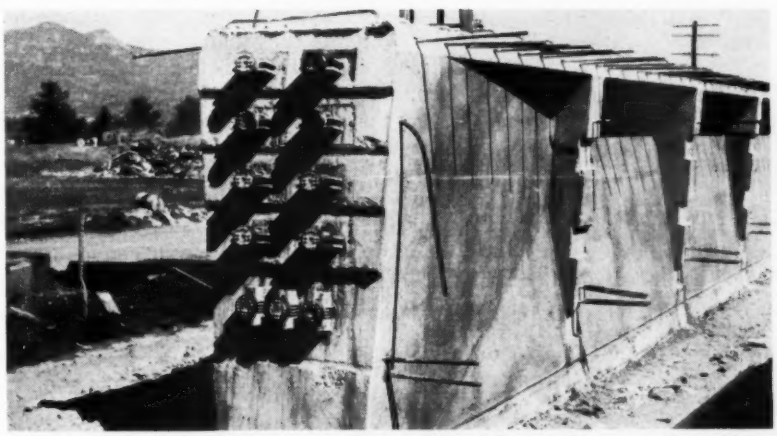
While the total number of power plants acquired last year was down from 1957, there was a sharp increase (164 to 205) in purchases of air compressors. The other two items—generator and motor-car engines—in this category showed decreases.

Even though there was a moderate decline in the purchases of bridge and building tools and equipment, a number of items in this category either held steady or showed increases. These included impact wrenches, hand-held timber saws, concrete mixers, derrick cars, paint spray outfits and drills.

SHALLOW DEPTH of the prestressed girders minimized the amount of grading necessary to obtain proper road clearance.

When designing two bridges to carry the main track of the Santa Fe over two access roads to the property of the Air Force Academy near Colorado Springs, prestressed concrete girders of the same size and length were used for all spans. This enabled the contractor to reuse the forms and do the work on an assembly-line basis.

Two Santa Fe bridges have . . .



ELEVEN tendons were used for the 71-ft 6-in bridge girders. Ends were protected by a 5 to 11-in concrete cover after the girders were erected.

. . . Prestressed concrete girders

● When final plans for the construction of the Air Force Academy near Colorado Springs had been settled, seven important bridges needed to be built to enable two access roads to be constructed west from U. S. Highway 85-87 to serve the north and south portions of the property. The Air Force Academy Construction Agency decided that this large number of bridges could be more economically constructed if reinforced-concrete, prestressed girders were used as this would permit a single concrete batching plant to be set up and the forms reused.

Two of these bridges were required to carry the single-track main line of the Santa Fe over the access roads. The designs and specifications for all the structures were prepared by Skidmore, Owings & Merrill, Chicago. Those covering the two structures to carry the Santa Fe track were sent to the railroad for approval. These were revised to the railroad's satisfaction and approved. These two bridges each have two spans, with a divided highway passing one-direction traffic at an angle under each span. There are four prestressed concrete girders per span. The girders were designed for Cooper's E-72 loading and AREA impact. They are 69 ft 10 in long between centers of bearings and 71 ft 6 in end to end. In depth they are only 5 ft 11 in.

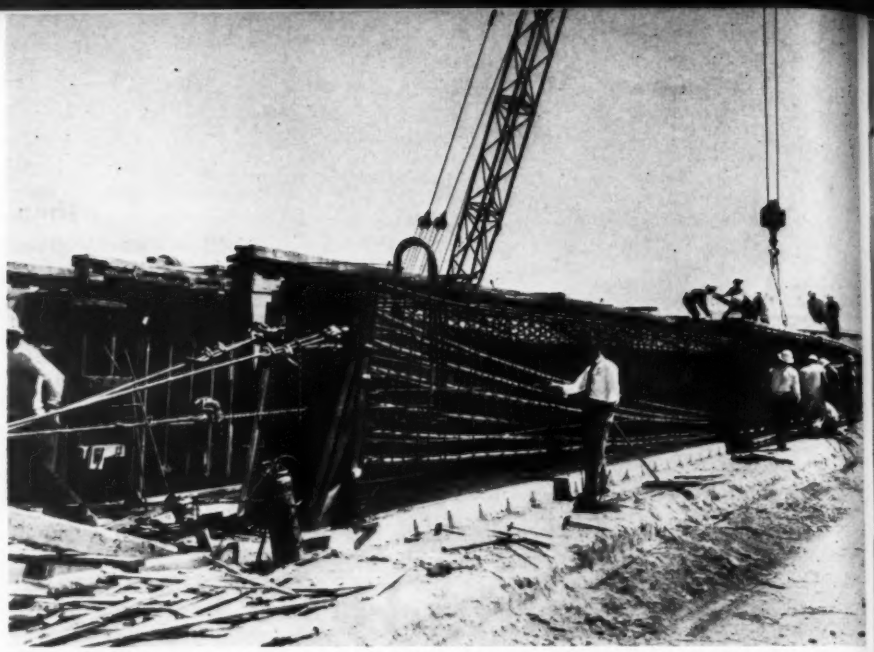
Shoo-fly tracks were constructed at both locations to pass railroad traffic around the bridge sites, and the abutments and piers were constructed. The bridge contractor set up a concrete-batching plant on the track of the Santa Fe at a point most convenient to serve all proposed bridge locations.

Casting beds constructed

At one end of each bridge site the contractor constructed a long, narrow casting bed which was wide enough to accommodate the width of a girder and long enough to permit four to be cast. The casting beds were 6-in slabs that were carefully surfaced to insure that they would be level and uniform in surface. Each of the beds at the railroad bridges were used twice, four girders being cast each time. The bed surface was coated with a liquid bond preventive each time. Deadmen were constructed along the casting slab at the ends of each proposed girder for the purpose of supporting the end bulkhead forms and the suspended tendons.

The prestressed reinforcement in each girder consists of a series of tendons each comprised of 16—¼-in wires having an ultimate tensile strength of 245,000 psi. The individual wires were accurately cut by a machine to insure uniformity of

length and the 16 wires comprising each tendon were threaded through a length of flexible metal tubing or sheathing having an inside diameter of 1¾ in. At each end the wires of each tendon passed through a 6-in by 10-in by 1¼-in bearing plate and then through a circular stressing washer against which the ends of the individual wires were button-headed. This arrangement permitted simultaneous stressing of the 16-wire groups from each end of the girder. The button heads and stressing washers were painted distinctive colors to facilitate matching their ends and location when being fitted into the end bulkheads.



END BULKHEADS, supported by deadmen, hold washers at right angles to stressing. Tendons are tied in position for maintaining a constant parabolic drape without any reverse curves. This view shows a highway span but the method used for the railroad spans was similar.

STRESSI
rams. W
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Uses 11 tendons per girder

Eleven tendons were suspended between the end bulkheads for each girder. They were spaced three in the lowest grouping, with four pairs above, and described a parabolic arc between their supported ends. The necessary conventional steel reinforcing rods were then installed and the side forms constructed.

The concrete ingredients were dispatched dry from the mixing plant in transit-mix trucks. Water was added while they were in transit and the number of specified revolutions was registered on a counter. The trucks, of 6 yd capacity, unloaded the mixture into ½-yd buckets which were picked up by a crane and poured through an 8-in throat into the forms.

The first pour of concrete for the first railroad girder was made on May 6, 1957. A 7½-sack mix, using type I cement, aggregates having a maximum size of ¾ in, a Pozzolith admixture and Protex added for air-entrainment, was used for the girders. This resulted in a 2-in slump concrete with 3.4 per cent entrained air. Prior to pouring the regular mix, a layer of rich grout about 1 in thick was placed on the bottom of the form to receive and hold the heavy aggregate.

The concrete was poured in longitudinal layers until the form was full and was vibrated both internally and externally. To assure a positive bond of the concrete to the reinforcing, compressed air was employed to keep the reinforcing clean as the pouring progressed.

The concrete was allowed to cure and the forms were removed from 3½ to 5 days after pouring. As soon as one girder had been stripped, the forms were reused for casting the next one. By the time the forms were stripped, the concrete had reached a strength of 4,500 psi, which was the strength necessary before prestressing. The concrete was then coated with Hunt's curing compound.

Stressing was done in accordance with a predetermined pattern. First the lower three tendons were stretched, then the stressing progressed upward on the pairs. The total initial wire extension of 4¾ in was divided between the ends, the elongation being held and transferred to the member through two high-carbon shim plates at each end.

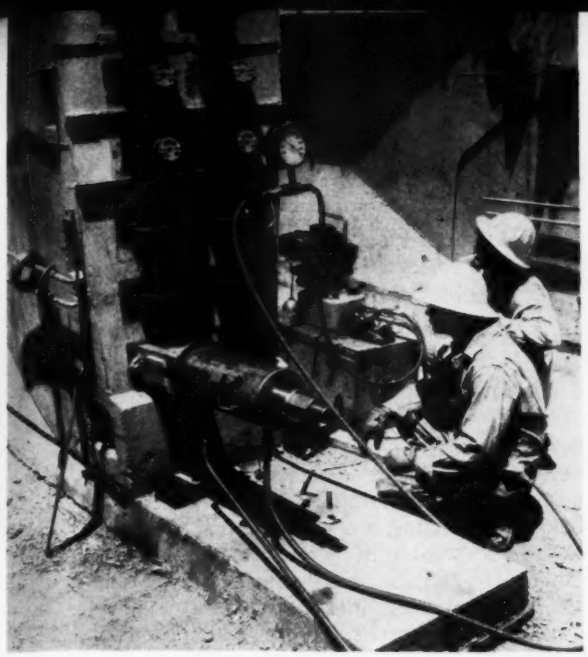
The prestressing force at the time of transfer was 126,800 lb per tendon, making a total transfer force of 1,394,800 lb for the 11 tendons. The force remaining after all losses due to creep shrinkage, etc., was calculated to be approximately 15 per cent less than the transfer force.

The stressing was accomplished with a 100-ton center-hole hydraulic ram at each end of the tendon. The hydraulic pumps operating the rams were powered by gasoline engines and air pumps.

After the stress had been applied, the metal sheath enclosing each tendon was blown clean by compressed air and was then filled with cement grout, consisting of cement, Pummicite and aluminum powder. These ingredients were proportioned to make a grout which would not shrink when setting up. This material was inserted through a hole in the end of the sheath by a diaphram grout pump. Grouting was continued until the extrusion at the opposite end indicated that all air pockets had been eliminated, after which both ends were plugged.

Meanwhile, for the use of small gantry cranes in moving the girders, the contractor had constructed a track to straddle the casting bed and leading to the abutment. He also constructed a temporary steel-truss falsework, between the abutment and pier, for supporting the crane rails over the span opening. The gantry cranes, one at each end, then picked up the girder and, propelled by a winch on a truck, carried it out over the bridge opening and set it in place. This procedure was followed until all four girders for the first span had been erected.

Forms for the diaphrams between girders and the deck slab, curb and sidewalks were constructed. Forms also were constructed at the ends of the girders to give a 5 to 11-in cover for the ends of the tendons, after which the concrete was cast in place. Shear keys tie the concrete deck to the girders and insure that the girders and deck act together to carry the live load. Asphalt-covered, corrugated, half-round drains were in-



STRESSING was accomplished by gas-engine powered hydraulic rams. When sufficient stress had been applied, the force was transferred to high-carbon structural-steel shim plates.

CONCRETE was mixed at a central batching plant and carried in transit-mix trucks to casting site. Casting bed was wide enough for one girder and long enough for four. The forms were reused.

stalled along the inside of each curb, after which the deck was coated with a 3-ply waterproofing membrane and 1¼-in asphalt plank.

Same procedure for second span

While the first span was being completed, the contractor was casting the girders required for the second span. When these were completed, the crane track was laid across the first span and the steel-truss falsework was erected for the second span. The same procedure as used in erecting the girders of the first span was followed for erecting the second.

The area between curbs was filled with stone ballast to a depth of 8 in under the ties, and the track was laid across the structure and connected to the main line at each end. Aluminum handrails on the outside of each walk completed the structure. Trains started operating over the first bridge on July 29, 1957.

Tendons shipped in coils

The tendons for these structures were fabricated by the Presscon Carporation, Denver, and were shipped to the site in coils. This company also furnished the equipment for the stressing and grouting work, as well as a full-time field supervisor to work with the bridge contractor in the placing, stressing and grouting of the tendons. The bridge contractor was the A. S. Horner Construction Company, Colorado Springs.

GANTRY CRANES straddled the girders, carried them on the rails to the bridge site and erected them. Steel-truss falsework was used to support the rails between piers. This view shows one of the highway bridges under construction.

DECK is a 10-in reinforced-concrete slab with sidewalks on each side. Curbs contain the ballast which was applied to a depth of 8 in under the ties. Ballast area of slab has a 3-ply waterproofing membrane and asphalt-plank cover.

'Glued' rail . . .

A progress report on the newest method of 'freezing' rail joints

● A revolutionary method of "freezing" a mechanical rail joint into an immobile unit is now being tested on several railroads. Developed by the American Railroad Curvelining Corporation, this method makes use of resin plastic adhesives, known as Bondarc, which were specially developed for American Railroad Curvelining by the Armstrong Cork Company.

Preliminary tests are reported to indicate that this method of creating a smooth continuous rail can add from 10 to 15 years of life to an existing track because it eliminates battered rail ends. Also, the "glued-track" is expected to solve maintenance problems caused by the expansion and contraction of mechanical joints. It is pointed out that failures of the adhesives, which have been quite rare and which can be traced to faulty installation, result in no loss of security because the adhesive is applied in existing mechanical joints.

Bondarc is one of a family of adhesives which depends on molecular bonds developing between the material being adhered and the adhesive itself. The area of contact is considered vital to the creation of a strong bond to ensure maximum resistance to slippage. Since the material is strongest in shear, it was believed that existing rail joints would provide a satisfactory assembly for testing, and would assure safe operation should the glue fail in a joint.

More than a year of laboratory research was conducted, first at the Armstrong Research and Development Center and the testing laboratories of the Bethlehem Steel Corporation, and later at the Fritz Engineering Laboratories at Lehigh University. Specimen joint assemblies of RE 132-lb rail with new 36-in RAJO 6-hole joint bars were furnished for these tests by the Rail Joint Company.

Laboratory tests are reported to indicate that at least 300,000 lb resistance to slippage could be expected from a joint where Bondarc was applied to the clean sand-blasted fishing surfaces of the rail and bars. It is said that an additional 40,000 lb could be obtained, if required, by butt-gluing the rail ends as well. Extreme cold had no effect on the glue itself, although this condition would be likely to present the most adverse tension effects in the track. Experiments using various bolt tensions indicated that tensions greater than 20,000 lb were not required, precluding the necessity of using high-tensile-strength bolts.

Positive and negative deflection tests were conducted to determine the influence of a load centered at the gap and the deflection under a 400,000-in-lb bending moment. Afterwards, the same joints were slip-tested and it was found that the slip characteristics had not been affected by the deflection.

Amsler alternating load tests, with loads of 44,000 lb positive and 22,000 lb negative being applied, gave bending moments of plus 400,000 in-lb and minus 200,000 in-lb, respectively. Again the joints were separated, one after 800,000 cycles and the other after 1 million cycles, revealing, it is reported, that vibration was not likely to cause failure in the glue, although cleavage at the rail ends might be a problem. It was felt the results of the laboratory tests were adequate to justify in-track installations.

During the first week of August 1957, a mile of glued track was laid on the Delaware & Hudson near Schenevus, N. Y., as part of its regular "frozen-joint" rail-laying program. The glued track consists of new 115-lb rail laid with Rail Joint head-free bars.

Since regular frozen joints have

This is how the joints were 'glued' on the QNS&L

On the QNS&L two basic methods of making "glued" joints were tried. On the first mile, the joint gaps in the rail in service were closed and the joints glued. On the second mile new rail and joint bars were used, which were glued out of service, 20 rails at a time, then installed in the track. Both methods were tried because of the long traffic delays.

Where the work was done in track the joint bars were removed and the bars and rail-end sides were sand-blasted, using a special sand-blasting machine mounted on a push car and supplied with air from a 375-cfm compressor through a 1,000-ft hose provided with outlets every 50 ft. This compressor, while equipped for on-track operation, was operated from a setoff and moved every 2,000 ft as gluing progressed. (On the D&H, the dead track permitted on-track operation of a smaller compressor.) A fine dust-free abrasive proved the best sandblast material since it cut rust quickly and left no dust film residue. Dried, screened local sand was also tried with moderate success but the surfaces to be glued had to be wiped clean with a solvent for good glue adhesion.

Following the sand-blasting, the

1. After joint bars had been removed and the gap closed with an expander the bars and sides of the rail ends were cleaned by sand blasting.

2. An end fired ov

been laid on both sides of this stretch, there is an opportunity for comparison. Various difficulties encountered in adapting the laboratory technique for making glued joints to field practice were overcome during the laying of the first side. For purposes of test, this side is therefore being discounted. The second side is considered the test rail. To date, only 4 of the 135 joints have had glue failures and these fractures were anticipated due to faulty application. Experience with this stretch is reported to have revealed that, once the glue has completely set approximately 20 min after installation, bolt tension becomes unimportant to the effectiveness of the glued joint.

In September 1957 two miles of used rail were converted to continuous glued track on the Quebec, North Shore & Labrador. This location was chosen for test because the coldest winter temperature registered last year was —70 deg F. In addition, this installation is daily subjected to 20 trains per day or approximately two million gross tons per month. The installation was made under these traffic conditions. This forced a complete re-vamping and streamlining of the technique used on the Delaware & Hudson.

Representatives of American Railroad Curvelining say their experience indicates that the techniques of applying Bondarc, while having basic requirements, must be adapted to fit the individual circumstances of each installation. It is a two-part adhesive in which a hardener (Part B) is added to the base material (Part A). One basic requirement is that the gluing areas must be free of mill scale and rust. Another is the pre-heating of both the joints and rail to help eliminate stressing the adhesive during the interval between the "jell" and "cure." A third is post-heating the joint assembly after application in order to hasten the "cure." Because of the two-part nature of the adhesive it is not advisable to pre-mix large quantities because the time available to apply the mixture is limited.

In the field, the temperature and length of time before Bondarc gels or takes its initial set are entirely dependent on temperature, both atmospheric and rail. Atmospheric temperature controls the "pot life" of the mixed Bondarc while the rail temperature determines the gelling and curing or hardening time. The temperature curve for Bondarc is nonlinear; thus field methods can be tailored to local working conditions.

On the Delaware & Hudson, the installation of glued joints was done in conjunction with the actual rail-laying operation in double-track territory. Thus long cure times could be tolerated, since traffic was detoured all day. This permitted elimination of the post-heat operation. Alternatively, the pre-heat operation might have been eliminated instead, had this been known at the time. The method used on the QNS&L is shown below.

It is emphasized by ARC representatives that, while the development of Bondarc is not yet complete, they expect the results of these initial installations to pave the way for more widespread trials throughout the industry.

2. Angle bars for each joint were stacked on rail ends and the assembly pre-heated by a propane-fired oven suspended from a push car.

3. Using push car as work table man applies adhesive to bars with rubber glove. "Glue" used is a two-part resin plastic adhesive.

4. Re-assembled joints were post-heated to hasten the "cure," using kerosene torches.

joint bars were stacked on top of the rail and the joint area pre-heated in a propane-fired portable oven, suspended from a push-car. By preheating, the glue was easily applied, the gel time was long enough to permit thorough assembly of the joint, and the heating time to cure was considerably reduced.

The glue car was a push-car work table on which the glue was mixed and applied to the warm bars. Solvent was available for wiping the bars clean and for clean-up. Initially, the glue was applied to the bars with an air-driven, cartridge-type caulking gun, but later it was found that a man using rubber gloves could apply it quicker with his finger since the preheated bars softened the glue to the consistency of melted butter.

The re-assembled joint was again heated, using two modified, hand-held kerosene torches supplied from a common tank. In the event of traffic coming before the cure was complete, the joint was cooled with water spray to stop the reaction.

5. If train should pass before "cure" was complete, the joint was cooled with water spray to stop the reaction.

ATTENTION SUPERVISORS:

This is what your fore

Last month you read Mr. Williams' discussion of the things supervisors expect of their foremen. But the supervisor-foremen relationship is not a one-way street. The supervisor has obligations to his foremen, too, that is, if he wants to establish a reputation with management for getting things done economically and on time.

● The hand car that was pumped by gandy dancers has all but disappeared. So has the smoke from the chugging locomotives that was the signal for the foreman to put his foot on the brake and say, "Stop and set her off, boys." The foreman in those days was an autocratic boss who enforced his discipline, or his displeasure, with the phrase, "All right you - -. Get your dinner pail and go home." He, too, has disappeared.

The modern railroad foreman in maintenance-of-way work has a higher standard of living than ever before. He has more formal schooling than the foreman of the last generation. He has more opportunities for self-improvement. He avidly reads trade and technical magazines that feature mechanized maintenance of way work, for he has more leisure. He has more respect for the dignity of the individual than his predecessors because the modern foreman is a manager. To the people who he supervises he is management.

Being a member of the management group he wants to be treated as such, and as a group leader, not a "pusher."

There are no mere cogs in the machine that is sometimes called "the company." People are involved in every decision that is made, in every plan that is developed, as well as in every action that carries out the plan that was based on the decision of management people. These people are individuals who bleed when they are cut. These people are individuals who dislike censure and they rejoice when they are rewarded by commendation. Management is a group of people from president to foreman who are held accountable for their decisions and who are judged by their ability to get things done through people. They are held responsible for the execution of the plans that translate the decisions of management people into actions that are done by people, through people, for people, at a profit.

Management people look to their fellow employee, the foreman, to get things done through people for the company. The foreman is not employed to direct machines and things —his assignment is to direct people who operate machines while be builds his reputation on his ability to get things done through people on time.

The foreman, as the manager of his group of people, expects his supervisor to treat him as such and to show by his actions and his attitude before the group that he recognizes the foreman as an individual who is a member of that group of employees described as management pople. The foreman wants to be treated as a group leader, not as a "pusher."

"Face" is important to him and he doesn't want to lose it before his men. He wants constructive criticism.

Oriental people use the word "face" to indicate their self-respect. Loss of "face" to them is a calamity. So it is to a foreman. A foreman loses "face" when his supervisor criticizes his work, his motives, or his judgment in front of the group he supervises. The foreman expects his supervisor to criticize certain phases of his work, but he expects that it will be done in a dignified manner as well as in the proper setting. People who do things make mistakes. The people who don't make mistakes are not the doers. A foreman expects that his supervisor will subscribe to this philosophy.

As a group manager the modern foreman wants his supervisor to appraise the decision he makes in carrying out the directives of management so that he can grow, develop, and thereby improve his ability to get things done through people on time. He knows and he expects that the work of his group will be analyzed, appraised, and reviewed with him by his supervisor so that constant improvement in the methods used to carry out the work will be a continuing and an effective process. This is constructive criticism. A modern foreman welcomes constructive criticism as well as a helping hand from his supervisor during the critical periods when advice and counsel will speed up the work and/or provide economies of operation, which is, of course, the common goal of the foreman and his supervisor.

The foreman who is a competent group leader and manager expects

Self-rating chart for supervisors

The greater the number of these questions you can answer with a "yes" the higher your rating as a supervisor. You can boost your rating still further by giving special attention to those areas of performance where a "no" answer is now indicated.

Do you
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ur foremen expect of you

By N. H. Williams, Division Engineer
Delaware & Hudson, Oneonta, N. Y.

that his supervisor will recognize proven merit and ability. Planned management and planned utilization of the man-hours available in the group requires a group leader who thinks with the ability to visualize the entire job to be done. A foreman manager is a group leader who is able to think in terms of the details of the work to be done, who has the knowledge and experience to determine best way to do it, and the judgment to decide who is the best qualified in the group to do the various operations that will complete the job at lowest possible cost and on time.

Being a group leader he is qualified to direct the work but needs information on what is to be done.

The modern foreman who is a "past master" at the art of planned management expects his supervisor will tell him what work he wants done and when he wants it done. But he disdains an outline of the work in meticulous detail that requires him to perform the work step by step with no flexibility of operation or plan to meet field conditions that require on-the-spot decisions by the person who has been placed in direct charge of the work.

Plans and programs for doing the work are necessary if the work assignments are to be carried out efficiently. Goals must be established. This requires realistic planning (not just a target to shoot at), so that the goals may be attained. The group manager expects that his supervisor will provide him with full information about the work to be done and that the plans will be written, where possible. He expects to discuss the many phases of the work assignment with his supervisor and that the discussion will cover the quantities and expected delivery dates of material to be furnished, as well as a list of the equipment to be provided for the job.

The modern foreman expects that his supervisor's office will follow up material delivery dates and make sure that the materials are delivered to the job on schedule, also that the "office" will follow up his requests for equipment maintenance and other staff services so that he can devote all of his time to the basic job of getting things done through people on time.

The foreman and the people he supervises work under rules and regulations known as an "agreement" between the company and the labor organization. Working assignments must be made in such a way that compliance with the terms of the "agreement" is assured. Whenever any doubt about the correct assignment of his people occurs, the foreman makes a record of the date, time, and other pertinent facts in the case so that he can defend his decision in the event the organization files a claim impeaching his judgment. The foreman as a manager expects his supervisor to keep him fully informed regarding the provisions and interpretations of the agreement and that full consideration be given to the establishment and maintenance of good labor relations. The foreman hopes his supervisor will do his utmost to hold the necessary paper work to an absolute minimum.

He wants to succeed but needs training, help and cooperation in the use of machines and men.

A modern foreman is a railroader and foreman by choice, not by chance. He indicated his desire to become a group leader when he asked for and accepted the assignment of foreman and manager of his group of people. Seniority is weighted so that merit and ability do not receive the recognition they deserve. The transition from a group leader supervising the work of people using hand and/or portable power tools to a modern foreman and manager directing people who operate machines is a tremendous one.

The modern foreman and group leader is ambitious and concerned. He wants to succeed. To that end training by his supervisor is expected so that he can get the utmost production from his group. The modern foreman needs full and complete data regarding the performance and capabilities of the machines operated by his people. He expects wholehearted cooperation from his supervisor in rearranging the people and machines in his group so that a balanced sequence of operations will produce quality work at the lowest possible unit cost.

The group leader and manager expects his supervisor to commend him for superior performance of duty.

Do you treat your foremen as fellow members of the management group? _____
Do you avoid criticizing your foremen where their men can hear you? _____
Do you constructively analyze and review the work of your foremen? _____
Do you allow foremen flexibility of action to meet field conditions? _____
Do you give your foremen full information about work to be done? _____
Do you make sure that materials are delivered on schedule? _____
Do you keep your foremen fully informed of union agreements? _____
Do you help your foremen obtain optimum production from machines? _____
Do you commend your foremen for superior performance of duty? _____
Do you give foremen full credit when passing on their suggestions? _____
Do you help to create and maintain an "injury-prevention climate?" _____
Is your relationship with foremen one of mutual trust and confidence? _____

Worthwhile ideas and suggestions given to the supervisor by the foreman for improvement of the operations and increasing the production of his group are put forward with the expectation that they will be communicated upward in accordance with the Golden Rule.

He needs help in establishing an "injury-prevention climate" and wants investigations conducted with an open mind.

The word "accident" connotes an ugly situation that was not planned or expected to happen. The prevention of injuries is of major importance in any plan for doing the work efficiently and economically. A group manager is in the field and on the job where injuries to his people occur. He knows that letters, posters, and slogans have a place in the injury-prevention program, but he has found out through his experience in getting things done through people that defensive accident prevention and the will to work without injury are sold to his people at injury-prevention meetings held on the job and in the field.

The modern foreman knows that, unless management people make a serious and a sincere effort to create and maintain an injury-prevention climate, he will be saddled with injury-producing conditions that are inherent in railroad operations. He expects his supervisor will program the time and money necessary to create and maintain an injury prevention climate with the corollary that his supervisor will promote injury-prevention practices by setting an example of injury prevention habits and personal conduct throughout his intimate contacts with the people in the field.

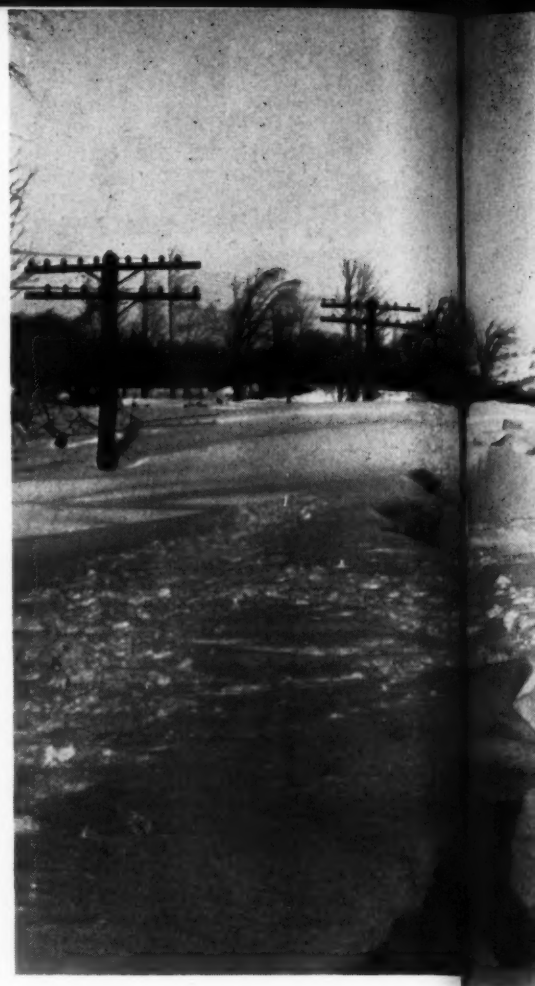
An injury prevention climate is maintained where the will to work without injuries has been nurtured and cultivated by promptly correcting all injury-producing conditions or practices brought to the attention of the person in charge of the work. This implies that the person who reported the injury-producing operation or practice will be told what measures are being taken to correct the condition and, where no corrective action is practicable, that the person requesting correction of the condition be told the reasons why the request could not be satisfied.

Where an injury occurs, the foreman expects that his supervisor will investigate with him the events that led to the injury, and that the investigation will be conducted with an open mind. The reason for the investigation is to find out what happened, how it happened, when it happened, why it happened, and what can be done to prevent a recurrence of the injury—not who can be blamed. A group manager believes, and he wants his supervisors to believe, that there is no work so urgent or important that sufficient time cannot be used to do the work without injury. Injuries are never economically justified. *Do you believe it?*

When the supervisor investigates a derailment the foreman expects that the facts will be separated from opinions so that the final determination of the cause will be conclusive.

As a manager and group leader, the modern foreman is expected to think ahead, to plan ahead, and to direct his people so that maximum utilization of the production potential under his stewardship will be attained. To reach this goal the foreman expects that his supervisor will see that he has full and complete knowledge of the programs, the plans, the work assignments, the quantities and delivery schedules of the materials, as well as the goal (completion date) for the job.

Communication up, down, and across that will develop and sustain morale, with paper work held to an absolute minimum, is expected by the foreman. Commendation, as well as criticism, is wanted by the foreman, for he expects that his supervisor will be a fair and impartial administrator, friendly yet not familiar. As a group leader, and as an individual member of the group known as management people, the foreman expects that his relationship with his supervisor will be one of mutual trust and confidence—a relationship built up and confirmed by each recurring contact. The modern foreman expects that his supervisor will be an administrator who lives by the Golden Rule, who is convinced that supervision is an art and a science. As an art, the purpose of supervision in the development of people. As a science, the function of supervision is to get things done through people —on time. *Will you do it?*



Machines are cu

DEEP DRIFT is opened by a Jordan spreader-snow plow.

ıre cutting snow-fighting costs

Dealing with snow storms is not only cold work but it takes cold cash —cash that is badly needed for essential property maintenance. This explains why a quiet revolution has been taking place in snow-fighting techniques. Wider use of switch-protection devices and other mechanized equipment, backed by careful planning, is making it possible for railroads to handle even heavy snow storms with little or no extra help.

• "You're always on the spot when it starts to snow. Whatever money you use for this purpose is wasted, and you don't want to waste any more than you have to. So you try to handle the situation with what men you have, but because of mechanization we don't have the basic force we did a few years ago. That means we don't want to call the men out any sooner than is necessary because after 14 or 15 hours they get tired and want to go home, and if the snow keeps coming down we're in trouble. But if we wait too long to call them out the situation might get out of hand, and we're in trouble on that account. But if we don't take a chance once in a while we find ourselves throwing money away."

Thus spoke the division engineer of a large metropolitan terminal as he discussed his snow-fighting problems. What he was saying was pretty much in agreement with the views of the many other maintenance-of-way officers who were interviewed to obtain information for this article.

These interviews reveal that snow-fighting, especially in terminals, is vastly different than it was a few years ago. Gone are the days when snow fighting was done largely by droves of extra laborers armed for the most part with brooms and shovels. They have been displaced by an imposing array of mechanical devices that make it possible generally to handle even heavy snowfalls with the regular forces.

For example, the division engineer quoted above said that not in the last

Sights like this are seldom, if ever, seen these days. In fighting snow the railroads are . . . . . relying mainly on mechanical aids such as those shown by the pictures on following pages.

Fighting snow with machines . . .

PILED SNOW on yard driveway is loaded into truck by crawler-mounted loaders.

CATERPILLAR bulldozers work at clearing snow from around stalled cars.

PLATFORM is cleared of snow and ice by Gravely tractor with rotary brush.

MOTOR GRADERS are handy machines for cleaning snow from paved areas.

SNOW on station tracks is picked up and sent to melting tank by Bros Sno-Melter.

15 years had it been necessary for him to hire extra help during the winter. This is not to say that snow fighting has become a fully mechanized operation; the man with a broom or shovel still has a part to play and some maintenance men say it is still necessary to take on extra men during heavy storms, although the requirements are only a fraction of what they used to be.

Is strategy changing?

When considering the snow-fighting problem today it is necessary to start with the basic fact that, on most railroads anyway, the winter labor force is much smaller than it was a few years ago. To be able to handle snow falls, even the heavier ones, with little or no extra help becomes, therefore, a problem whose solution not only requires the use of every mechanical aid but also a careful planning of the basic snow-fighting strategy with the aim of making the most of the men and machines available.

This can mean several things. It means, for example, taking care of key interlockings and other points while letting other locations go until they can be handled in an orderly manner. "Why," asks a division engineer, "should we try to keep switches to all spurs and industry tracks open when only a small fraction of them need to be switched right away?" This thinking has led to an increase in the practice of having one or two trackmen ride switch engines for the purpose of opening up switches as necessary.

If it melts, pushes, scoops or loads it will handle snow

The need for making the most effective use of a smaller winter force has meant another change in thinking, this one even more basic but perhaps not as widespread. A maintenance officer in charge of snow fighting on a large metropolitan terminal put it this way: "At one time our management took the position that trains should operate during snow storms just the same as in fair weather. This approach naturally required a tremendous effort on our part, entailing the hiring of large numbers of extra men. Now our instructions are to keep trains moving as nearly as possible on schedule, but not worrying too much if they are a few minutes late." While admitting that this practice involves a "calculated risk," he said it avoids excessive snow-fighting expenses.

With only a minimum force available, effective supervision is more important than ever before, the interviews revealed. This means insistence on centralized supervision, according to one division engineer. He claims that much of the disorganization that occurs during snow storms arises from the fact that "upstairs roadmasters" try to take it upon themselves to direct the operations. "Trouble has occurred in the past," he said, "because men who were supposed to be stationed at certain points were called to other locations by tower men or others. The result was that the roadmaster would lose contact with his men. Key points would be left unattended while the men were working at less important points. I take care of this situation by having all calls from 'upstairs' routed to me so that the 'working' roadmasters can function without interference."

There must be a plan

Advance planning, always a "must" in snow fighting, is emphasized even more today than in the past. In any well-laid plan, printed instructions are issued which make specific assignments of men and equipment, leaving no doubt regarding who will be responsible for particular locations. They will show the names and telephone numbers of all

Switch protection devices, using compressed air, gas, electric power or kerosene, may be had to fit any circumstances

key men, and because it is often necessary to rent equipment from outside firms, the instructions will show the names and telephone numbers of contractors and others owning equipment that may be useful in handling snow.

The plan of attack will necessarily include instructions for winterizing and otherwise preparing for use all equipment that may possibly be needed. And instructions will be included for installing, repairing and checking switch heaters and blowers.

Other matters covered in the plan of action include the clothing to be worn, the safe operation of motor cars, the checking of drainage conditions, precautions to be taken under winter conditions, the feeding of the men, the checking and erection of snow fences, the provision of track shims and braces, the checking of rail anchors, etc. And highway departments will be requested to use care when snow plows are operated over grade crossings to avoid creating conditions hazardous to railway operation.

Maintenance men are unanimous in the belief that switch protection devices—heaters and blowers—are more responsible for the railroads' ability to fight snow with a minimum of men than any other single category of equipment. Electric, gas-burning (natural gas and propane) and pot-type heaters are all used. Some railroads employ several or all of these types, including snow blowers, while other concentrate more or less on one type.

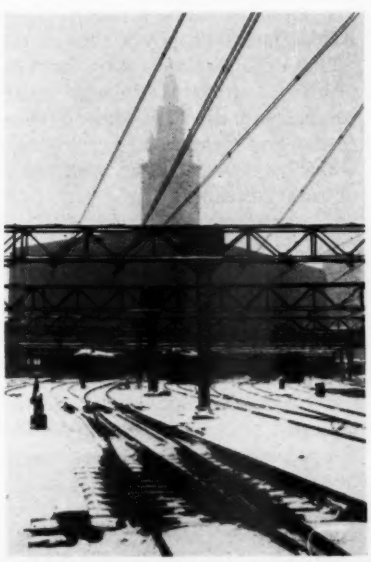
The development of remote control devices has been an important factor in the adoption of switch heaters and blowers for the protection of outlying switches, especially automatic switches in CTC territory. For example, in the Cascade mountains in southern Oregon, the Southern Pacific has installations of propane-burning heaters at 50 switches in C T C territory. Remote-control equipment for the heaters is located in the dispatcher's office at Dunsmuir, Calif., 200 miles away. During the winter the dispatcher is kept advised of snow conditions at the heater installations by train and wayside radio and by telephone.

There are many similar installations of gas and electric heaters and snow blowers, although in most cases the distance from the control point is somewhat less than the figure mentioned. In a typical installation of snow blowers on a northern road the switches are located 105 miles from the control point. Air for the blowers is provided by compressors at the site.

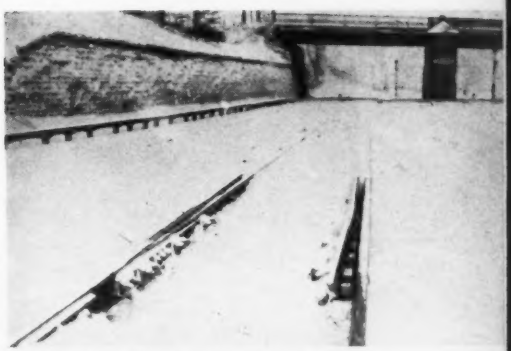
For isolated turnouts several devices are in use or under test for turning on the heaters or blowers automatically when the amount of snowfall has reached a pre-determined depth. Reports are that more work needs to be done to assure the reliability of these devices.

Weed burners as snow melters

For keeping tracks and switches free of snow in terminals the weed burner is standard equipment on some roads, although they are used with care at interlockings to avoid damage to the wiring and switch machines. One large road uses eight weed burners at a metropolitan terminal, most of which are kept in heated shelters so they can be started at a moment's notice. Maintenance officers of the road say there is no drainage problem with the use of



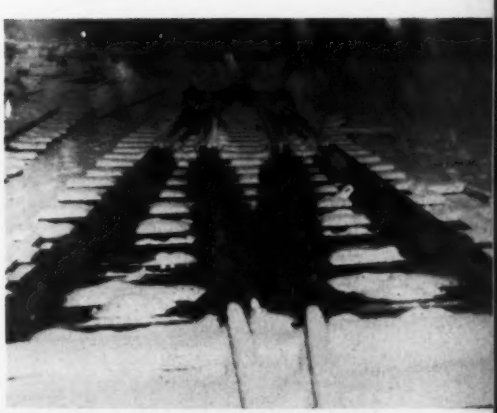
SWITCH protection is practically a "must" in terminals. GE electric heaters here.



WHILE snow piles up elsewhere a Racor Snow Blower keeps this turnout open.

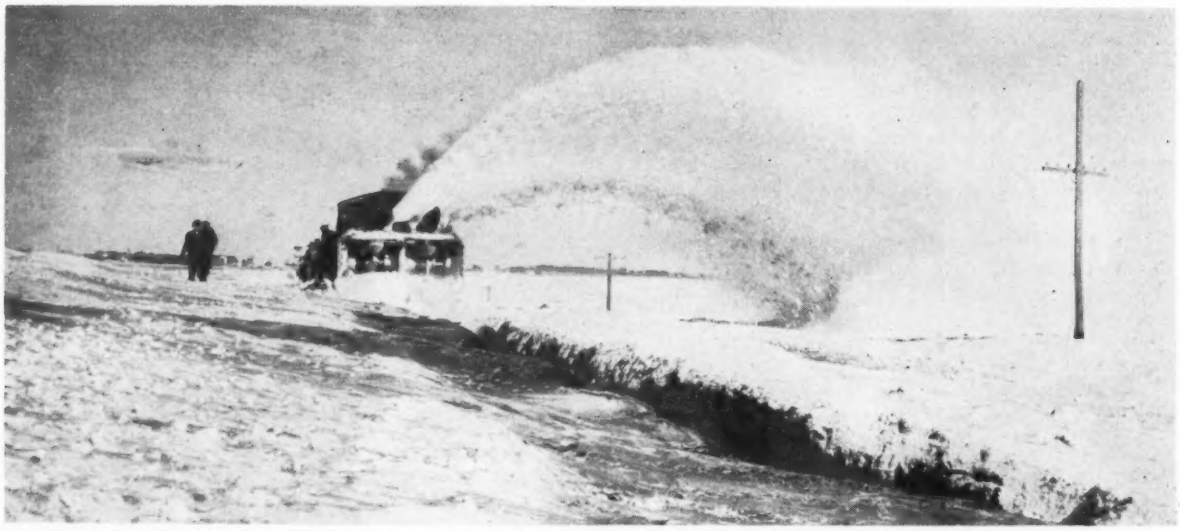
PROPANE switch heaters are widely used. White Model G-3 heaters are shown here.

THIS SWITCH is equipped with Winter King pot-type switch heaters.



ELEC TIME switch heaters kept this switch open during a 6-in snowfall.

Teamwork out on the line: Plows and switch protection devices



BROS 2000-hp diesel-electric snow plow eats its way through a deep drift. Once opened snow cuts should be widened.

HEATERS at this outlying switch were turned on by dispatcher sitting in his office 200 miles away. Installation consists of Rails Company propane-burning heaters.

the weed burners because the cinder ballast on the leads where they are normally used has been replaced with slag.

Since weed burners occupy the tracks there is a problem in keeping them operating in busy yards. Said one division engineer: "We simply tell the trainmaster and yardmaster that we've got to have use of the tracks if traffic is to be kept moving. The result is a high degree of cooperation from the operating people. In fact, it is not uncommon for a yardmaster to request that a weed burner to be dispatched to a particular point."

Maintenance men are loud in their praise of the truck as a snow-fighting weapon. The reason is that a small gang with a truck becomes a hard-hitting, mobile "task force" that can be quickly shifted from point to point as trouble develops.

Many other types of motorized and mechanized equipment have cut down man-power needs in winter. For cleaning snow from driveways and platforms practically every commonly used type of crawler and wheel-mounted grading or material-handling equipment comes into use, including bulldozers, front end loaders, motor graders, scrapers, dump trucks, and even power shovels and cranes equipped with snow buckets. Wheel-type tractors with rotary brooms are used for cleaning platforms and sidewalks, as are two-wheel rubber-tired units with blades or rotary brushes.

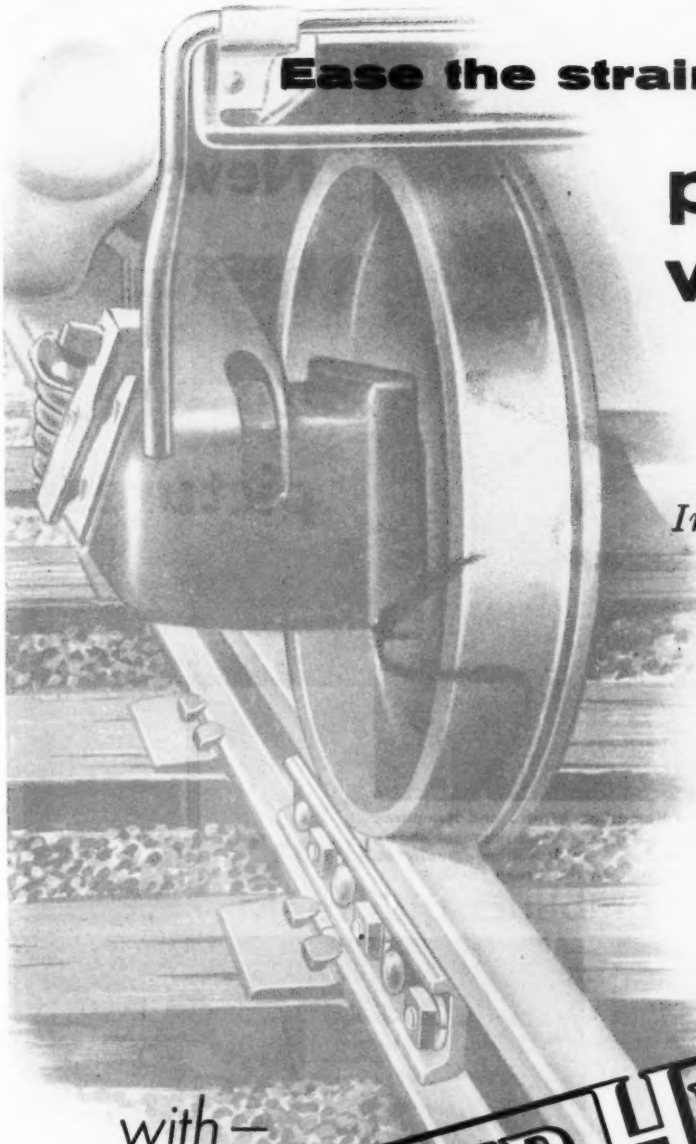
Compressed air, supplied from portable compressors, is being used successfully to remove snow from switches. This is done simply by directing streams of air from handheld hose lines as needed. Various types of compressors have been used for this purpose, including tractor-mounted units, some equipped with flanged wheels for on-track operation.

Equipment in use for clearing snow from tracks in yards and terminals also includes spreader-ditcher-snow plows which, with a wing extended, may clear two tracks in one operation, and a snow-plow-melter which may either cast the snow to one side or deliver it to a melting chamber.

Keeping main and branch lines open today is pretty much a matter of making the best use of the types of snow-fighting equipment that have demonstrated their effectiveness over the years. These include spreader-ditcher-snow plows, wedge plows and "dozers" of various types, and rotary plows, the latter being used primarily in mountainous country.

Snow fighting out on the line, as in terminals, is a matter of learning and relearning the same lessons over again, say experienced snow fighters. They emphasize the need for keeping the equipment in operating condition, stationing it at strategic points, getting it into operation at the earliest possible moment after the start of a storm and operating it at frequent intervals to keep the situation under control. Experience has taught them to be prepared for a second snow fall following hard on the heels of the first, and that deep snow drifts, once opened, should be widened as soon as possible.

All experienced snow fighters have this word of advice to offer: "Just because there may have been a series of years of only moderate snow fall, don't be caught napping. The worst blizzard in history could start tonight."



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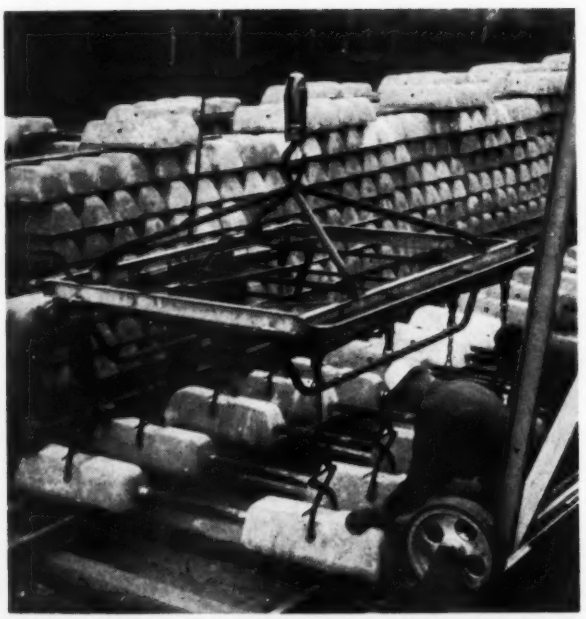
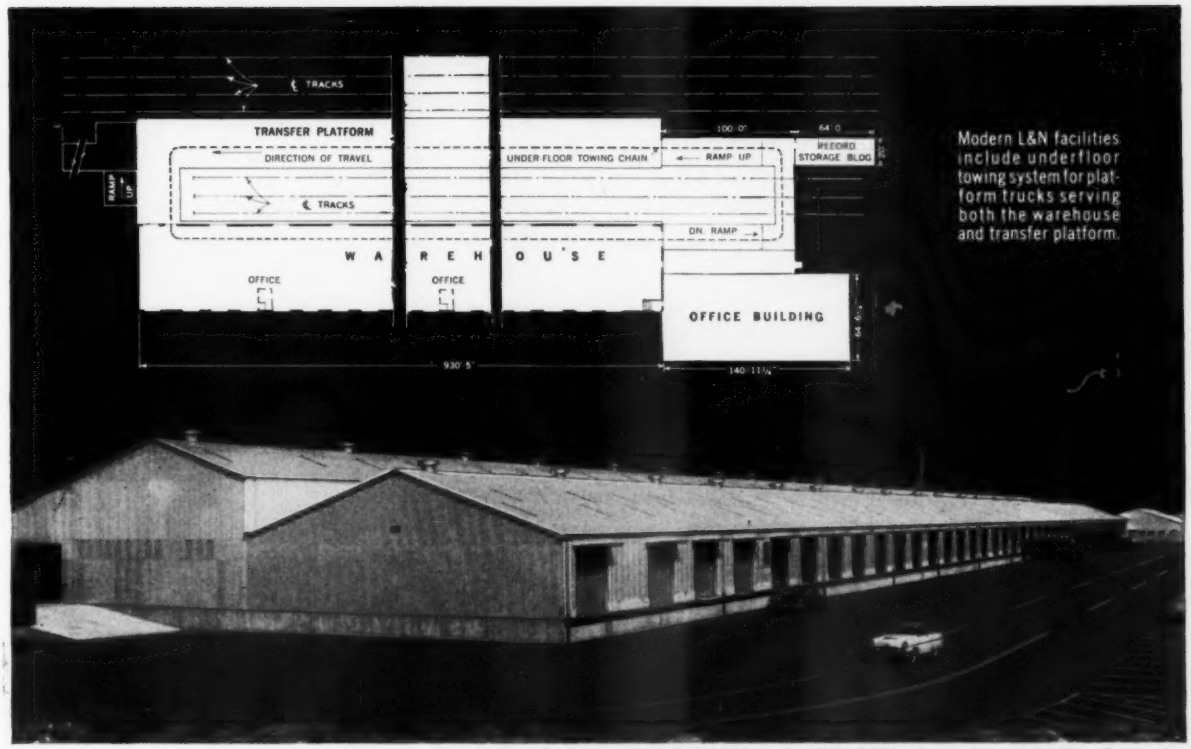
News briefs in pictures

A 14-MILE LINE CHANGE on the Northern Pacific between Kamaskat, Wash., and Humphrey is now underway through the Cascade mountains. Morrison-Knudsen Co. equipment shown here is grading the new line which replaces existing trackage which will eventually be innundated by reservoir water from the new Eagle Gorge dam on the Green river.

FOURTEEN 108-in Armco Multi-Plate pipes were installed by the Quebec, North Shore & Labrador to replace an existing trestle. After installation, it was decided to add the upper seven 60-in pipes as "safety valves" to accommodate spring thaws.



SPECIAL HANDLING devices, including the multiple-grapple shown here, are enabling the Swedish State Railways to install 130 ft of rail and concrete sleepers in two hours' time. Track structure is a new design, designated "SJ-101."



Overall size of attractive L&N freight house is 138' x 1,030'. Armco ALUMINIZED STEEL® covering material (a special hot-dip aluminum coated steel) requires no expensive painting or other finishing.

Truss-Type Armco Steel Buildings

Meet Big Building Needs for L & N

Radnor Yard, near Nashville, Tennessee, is the site of one of the largest factory-made buildings for railroad use . . . a truss-type Armco Steel Building. The multiple-span structure serves as modern freight house facilities for the Louisville & Nashville.

Truss-type Armco Buildings provide an efficient yet low-cost way to solve big building problems. With clear span widths up to 100′ and practically unlimited lengths, you can select the exact size you need . . . and easily fit it to your specific requirements. The post-free interior gives complete freedom of floor plan layout.

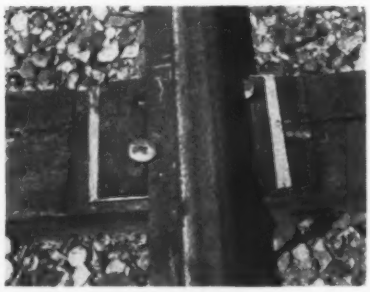
What about costs? You get all the economies of a mass-produced building. All parts are prefabricated to eliminate waste. Also, your savings continue year after year with low maintenance costs.

For more information on the complete line of Armco Steel Buildings for railroad use, write us for Folder 11856. Armco Drainage & Metal Products, Inc., 3467 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corp.

For more information or prices,
Call Western Union and ask for Operator 25

ARMCO STEEL BUILDINGS

Products

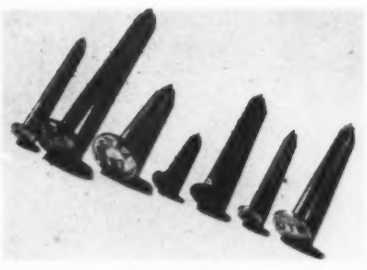


Longer tie life with . . .

Mastic tie seals

INCREASED tie life of from 8 to 10 years is the aim of a new product which is said to reduce plate cutting and moisture penetration of ties. Designated the Nox-Rust Tie Seal, it is available in rectangular sheets, 8 in wide by 13 in long and 3/16 in thick, and is fabricated from a reinforced rubberized mastic composition. Installed between the ties and the plates, the seals are compressed under the weight of traffic to penetrate into the cracks and waterproof the adzed surfaces.

The manufacturer states that the Nox-Rust Tie Seals are not to be confused with tie pads. The seals are said to form protective dams around the edges of the plates and collars around the spikes, thus protecting them against deterioration as well as preventing the entrance of sand or grit. No special application equipment is required. *Daubert Chemical Company, Dept. RTS, 333 No. Michigan Ave., Chicago.*



Made to order . . .

Marking nails

A VARIETY of marking nails has been made available for such purposes as identifying company property, indicating installation dates on ties and telephone poles, locating screens, and similar uses. The heads may be imprinted with a number, a letter or a combination of each, either raised or depressed on the head of the nail. Large nails may be supplied with heads having an outer rim to protect the marking when being driven.

Marking nails are generally made of non-corrosive copper or aluminum, although they also can be made of many other metals. Suggested nail sizes range from No. 12 gauge (.105 in. in diameter) to 5/16 in. in diameter. Suggested head diameters range from 5/16 in on the No. 12-gauge nail to 1 in on the 5/16-in nail. Lengths can run from ⅜ in. in the No. 12 gauge to 7 in. in the 5/16 in size. *John Hassall, Inc., Dept. RTS, Westbury, N.Y.*

Low upkeep claimed for . . .

New crane-excavator

TIME-SAVING accessibility, low-cost maintenance, versatile crane-excavator service and fast, rubber-tired mobility are a few of the advantages cited by the manufacturer for a new machine designated the Model 11B Transit Crane. Available as front-end equipment for this unit are a backhoe, a ⅜-yd shovel, a 10-ton lifting crane with booms ranging from 25 to 70 ft in length, and clamshell, dragline and magnet attachments.

Model 11B is mounted on a 6-wheel-drive carrier having a chassis frame of welded construction and is powered by a 6-cylinder gasoline engine driving a horizontal transmission shaft through a triple-strand roller chain enclosed and running in oil. The carrier provides speeds up to 47 mph. The unit features a two-section cab; one section provides ample room and full visibility for the operator while the other covers the main machinery and power plant.

The main machinery consists of two main shafts with drums, clutches mounted on anti-friction bearings, brakes and gears. The swing-circle assembly consists of an upper circle attached to the revolving frame, a lower circle welded to the carrier, and two rows of ball bearings, one of which takes the downward loading and the other the upward loads. *Bucyrus-Erie Company, Dept. RTS, South Milwaukee, Wis.*

Greater range with . . .

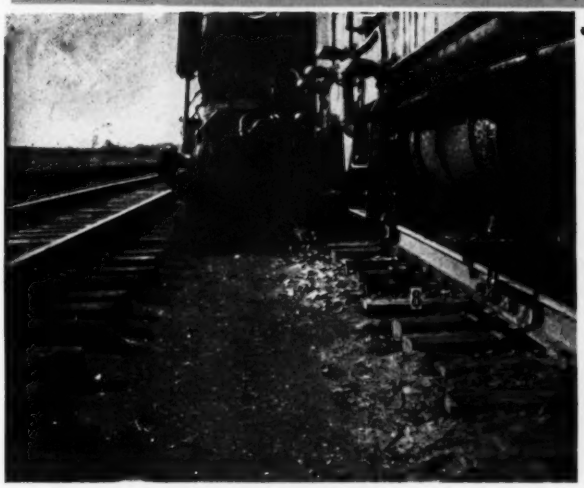
New power speaker

DESIGNATED the "Big Voice," a new transistorized power speaker has been made available which increases the effectiveness of two-way mobile radios by extending the listening range hundreds of thousands of feet. Also, by turning a simple control, the speaker is converted into a powerful public-address system.

The outside-mounted "Big Voice" speaker, along with its dash-mounted control unit, provides three types of operation to a vehicle equipped with any Motorola two-way radio, according to the manufacturer. The radio may be used normally, receiving through its regular dashboard speaker; then, if the driver must leave the vehicle, receiver output can also be switched through the "Big Voice" speaker enabling the driver to hear incoming messages, even though he may be hundreds of feet from the vehicle car; or, the "Big Voice" speaker with the radio microphone can be used as a public-address system, with the dashboard speaker remaining connected to the receiver to keep the radio in operation.

With five transistors in the speaker and control unit preamplifier, the "Big Voice" speaker provides up to 15 watts power output at 12 volts and 5 watts at 6 volts while holding vehicle battery drain to a minimum. According to the manufacturer, the speaker itself is rugged and weatherproof, made of solid cast aluminum. Its double reentrant form produces true voice reproduction at full power. A swivel mount for directional control is an optional feature. *Mororola, Inc., Dept. RTS, Chicago 51, Ill.*

1931 27 CONSECUTIVE YEARS 1958
MODERN BALLAST CONDITIONING



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"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 27 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

"R.B.C.C." 5 unit equipment does a thorough ballast conditioning job, cleaning two center ditches or two shoulders or one of each at one trip.

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RAILWAY TRACK and STRUCTURES

What's the answer?

To be answered in April

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.

DEADLINE: February 28

1. To what extent can "X-Rayls" (browns), short rails (greens), and No. 2 rails (whites) be utilized in the production of continuous-welded strings of rail? What changes, if any, must be made in the welding set-up to accommodate any or all of these rail classifications? Explain.

2. What factors determine whether a culvert should consist of a single pipe of large cross section or two or more smaller pipes? Explain.

3. To what extent is it practical and economical to make tie renewals in conjunction with undertrack sledding and plowing operations? What, if any, are the disadvantages of this practice? Explain.

4. In what types of railway buildings is it desirable to provide an emergency power plant to furnish electricity in the event of a commercial power failure? What factors enter into the selection of such a plant? Explain.

5. Should drainage (sump) pumps be serviced at regular intervals? If so, how often and to what extent? Explain.

Send answers to:

What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois

Do you have a question you'd like to have answered in these columns? If so, please send it in.

Concrete block for RR buildings

What are the advantages, if any, in the use of concrete-block construction for railway buildings? Disadvantages? For what types of structures is this construction suitable? Explain.

Depends upon climate

By R. H. PEAK
Division Engineer
Illinois Central
New Orleans, La.

The relative advantage of concrete block construction for railway buildings over other materials depends on the climatic conditions existing at the building site. In the southern termite territory, the use of ordinary wood frame construction can lead to costly maintenance problems and short service life. In coastal areas where dampness is prevalent, a metal building does not give the life which can be obtained from concrete blocks.

For the ordinary small rectangular building with simple window and door arrangement, such as is used for locker rooms, tool houses, the smaller yard offices, etc., a concrete-block building can be constructed for little if any more cost than a wood frame or a prefabricated metal building. This building will give a long life and a neat appearance, not being subject to rot, corrosion or insect damage. While initial painting may be desired for damp-proofing, this painting need not be renewed or, if renewed, can be on a much longer cycle than would be permitted for wood or metal. If the block building is damaged by being struck by a vehicle, it can be repaired more readily than a steel building and in most cases more readily than a wooden one.

The only disadvantage to use of concrete block construction is the inability to move the building should the need arise. For this reason, this type construction should not be used where there is doubt as to the long-range need for the building at the location selected. This is often difficult to determine, leading some railroads to refrain from using blocks; but in many cases the risk of having to move the building can be made so small that the maintenance savings offered by concrete blocks will overweigh it.

To summarize, where climatic conditions will shorten the life of wood or metal, concrete block construction can be used for small, rectangular, simple railway buildings to give worthwhile maintenance savings at little, if any, increase in cost.

Many desirable features

By J. W. ROWLAND
Supervisor of Structures
Long Island
Jamaica, N. Y.

Using concrete blocks, no forms are required, no equipment is necessary and construction is cheaper. Concrete block walls, when necessary, can be reinforced and strengthened by filling voids with concrete encasing reinforcing steel if required. Such a building can be built at remote places on the railroad where it may be impossible to deliver concrete aggregates or transit-mixed concrete.

Such a building can be constructed more readily in cold weather than by using poured concrete and is an excellent backing for facia brick, stone, tile or other decorative facing materials. Other advantages of concrete blocks include: Fireproof partitions for interiors of buildings; excellent insulation and insurance against undue sweating of walls; very good surface for stucco or plaster; and variation of sizes and finishes to accommodate any requirement.

Disadvantages of concrete block in railway buildings are very few. The main objections are its limited load-bearing capacity as compared to brick or concrete; the limitations imposed on stepping off or sloping, such as filling ends of a hip roof or gables to match the pitch; and limited lat-

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LIFTS UP TO 15 TONS — Here is a fast, one-man operated crane that serves several widely-separated yards — or drives 30 or 40 miles to do a special job, and gets back in the same day. In fact, 21 miles is less than an hour away with this Koehring 205 Cruiser. Its travel is unrestricted — overall width is only 8 feet. Axle-load distribution meets street and highway regulations in most areas — even when carrying 25-foot folded boom.

For all its speed and roadability, this 4-wheel-drive 205 Cruiser has the tractive power to climb 30% grades. It's easy-handling, maneuverable on or off-pavement — turns in 27½-foot radius. Has power-steering, smooth torque-converter drive, big safe air hydraulic brakes. One engine supplies all power for work and travel — one man controls all operations. In addition to fast road speeds, you get a full range of low shuttle-speeds from 0 to 7 m.p.h., for lift-and-carry.

It safely lifts up to 15 tons (based on 85% rating). Butt- or pin-connected boom can be extended from 25 to 70 feet. Or, 15 to 30-foot jib can be added to 65-foot boom. 205 Cruiser handles ½ to ¾-yd. clamshell or dragline, converts to ½-yd. shovel or hoe. Truck, crawler, RailAid mounting also available. See Koehring distributor, or mail coupon.

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eral resistance for installations such as cellar walls.

Concrete blocks can be used for station platform curbing, passenger stations, low walls, pits for catch basins and manholes, for raising copings of bridge slabs to better retain ballast, small waterway dams, paved gutter sides, and many types of roadway buildings.

Reducing fuel oil waste

How can the waste of oil be prevented when fueling locomotives? Is there more or less waste when the valve is at the nozzle end or the mast end of the delivery hose? Explain.

Nozzle-end valve best

By R. H. GUNTER
Assistant Engineer
Louisville & Nashville
Louisville, Ky.

At practically all our fueling stations we use a quick-closing valve at the nozzle of the delivery hose. I have found that any oil spillage is either due to the human element—more or less carelessness on part of the employee—or else due to a faulty valve.

Most of our oil spillage formerly came from bottom unloading of tank cars. We have now eliminated this type of handling and have gone to overhead unloading. Since doing so, we have little trouble from spillage.

I believe that if a good quick-closing valve is used and the employee is careful and gives the nozzle time to drain, there should be very little spillage of oil, although I have known valves to stick and permit oil to flow all over the platform before being cut off. We always provide a gate valve on the fueling stand in addition to the nozzle valve. Even the best of nozzle valves will drip sooner or later, and then must be overhauled in the shop for repairs.

Standardization needed

By W. F. ARKSEY
Engineer Water Service & Fuel Facilities
Great Northern
St. Paul, Minn.

We have been testing equipment for the past two or three years in order to develop a suitable automatic shutoff for controlling the fueling of our locomotives. This system consists of a float valve on each side of the locomotive in the fuel tank, and a coupling and valve combination on the locomotive and hose which shuts the fuel off at the face of the locomotive filling fitting and also at the face of the hose nozzle. The float valve is made by the Kohler Company and the adaptor and nozzle by the Aeroquip Corporation.

We consider the system to be working very satisfactorily on our road. However, such a system—which has special threads on the adaptor and nozzle—reduces the interchangeability of diesel units from one railroad to another. Other manufacturing companies are working on similar systems, using other methods of making the coupling to the locomotive. I believe that, eventually, a standard connection will have to be arrived at so the locomotives can be run over more than one line.

I believe there is less waste of fuel oil with the nozzle at the end of the hose than with a valve on the mast. When the fuel tank is completely filled there is no room left to allow the oil to drain from the hose, and when it is disconnected a considerable amount runs out on the ground. However, I believe a greater amount of fuel is wasted through the overflow on the locomotive due to overfilling of the tank. The waste can amount to several thousand gallons per month at one station.

Hot lunches for work gangs

What are the advantages, if any, in providing hot lunches for work gangs out on the line? Should the food be delivered to the work site? If so, what special equipment, if any, is needed to keep it hot?

Several advantages

By JOHN AYER, JR.
Chief Engineer
Denver & Rio Grande Western
Denver, Colo.

Where work gangs are housed and fed in boarding outfit cars it is just as easy to feed the men hot lunches on the job site as it is cold lunches. The food is prepared in the kitchen cars and shortly before noon it is placed in suitable containers and hauled out to the job site either by truck or motor car. The waiters accompany the food and serve it to the men as they pass by in line. No special equipment is necessary to keep the food hot as usually the volume is sufficient to maintain its heat from the kitchen car to the job site.

One advantage is that a better variety of food is possible for the men working. Another is that this practice does not load the kitchen forces down with the necessity of preparing two meals before the men leave the camp cars for the work site in the morning.

Saves Time

By K. E. DUNN
Engineer Maintenance of Way
New York Central
New York

We believe that various types and sizes of gangs present different problems. Therefore, in this discussion we are limiting our opinion to what we believe should be done in large gangs which are housed in camp cars or trailers, similar to rail or tie and surfacing gangs.

We believe that hot lunches should be provided at the work site in the interest of saving time, particularly where the gang is working under detour. We limit the lunch period to 30 min. The lunch should be delivered to the work site at approximately the beginning of the lunch period. We do

WHY SWITCH TO LARGER TIE PLATES?

USE BIRD Self-Sealing Tie Pads *with smaller plates*

Note excellent condition of these ties after 9 years' service on railroad bridge spanning the Ohio River at Louisville, Kentucky. 7½" x 10" tie plates were installed with *Bird Self-Sealing Tie Pads* when ties were new in 1948. Vulnerable underplate and spike hole areas are in as good condition today as they were 9 years ago. (Photos courtesy of Kentucky & Indiana Terminal Railroad.)

Here's conclusive proof that smaller tie plates, used with Bird Self-Sealing Tie Pads, carry the load satisfactorily while affording better protection than larger tie plates without pads. This bridge installation, on a 6° curve, is subjected to the heavy tonnage of three railroads. After nine years of service, Bird Self-Sealing Tie Pads are still firmly sealed to the tie. The vulnerable underplate and spike-hole areas of the ties are in as good condition as the day they were installed. Moisture and abrasive materials could not penetrate the effective seal of the pad to the tie.

So why switch to larger tie plates? Instead use Bird Self-Sealing Tie Pads with smaller plates for longer tie life. For informative booklet, containing facts and figures on actual dollar savings, write to Bird Tie Pads, East Walpole, Massachusetts, Department HTS-1.

Bird Self-Sealing Tie Pads Are Recommended For:

Bridge Decks • Curves • Switch Ties • Highway Grade Crossings and Other Paved Areas • Crossing Frogs • Insulated Joints • With Smaller Tie Plates • Pile Cutoffs • Through Station Platforms • Out-of-Face Installations in Rail-Laying Programs • Sandy Locations • All other locations where tie life is short or replacement costs high.

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this by sending a truck driver to the camp to deliver the food. We provide thermos-containers for coffee and soup, and aluminum baskets insulated with fibre glass to keep sandwiches cool in the summer months and to keep them from being abnormally chilled during the winter months.

Of major importance

By FRANK R. WOOLFORD
Chief Engineer
Western Pacific
San Francisco, Calif.

The subject you propose for discussion, that is, requiring work gangs to remain on project during meal periods by either providing their own lunch or by the carrier transporting lunch to the project site, is one which I think is of major importance. Economical maintenance is dependent upon: (1) As full a utilization of all available assigned work hours as possible; and (2) a happy and contented work crew.

No. 1 above, in order to be successful, requires that personnel remain on the job site and either provide, or through some outside means, be provided with suitable meals without the necessity of their traveling to and from headquarters.

No. 2 can certainly be greatly fostered by providing, where practicable, hot lunches, especially during periods of inclement and cold weather. Hot meals to most Americans are desirable and stimulate good employee relations. Of course, means and facilities are not always available for furnishing hot lunches. Usually such are available only when work crews are assigned to either trailer or box-car field roadway gangs on which boarding facilities are maintained.

Where boarding facilities are maintained and available, it is highly desirable that hot lunches (I mean hot and not lukewarm) be provided for the gang personnel in one of the two following ways:

(1) Using proper thermos equipment, both hot and cold, according to the consist of the meal, together with other necessary sanitary containers. Under this arrangement, the gang would carry the meal with them when leaving assembly point and proceeding to project site. We have found thermos equipment most practicable and effective.

(2) Where thermos equipment is not available, the hot lunch would be prepared by the cook car and placed in as suitable a container as possible for retaining hot or cold temperatures. Immediately before the meal period, it would be transported by kitchen personnel to the work site and served there. Naturally, if great distances are involved, there is a possibility that some of the meal would have to be warmed over immediately before serving.

A few of the advantages of providing a hot lunch in preference to a cold one are: (1) A more attractive menu can be provided; (2) a hot meal is always more appetizing and conducive to good work; (3) a hot meal is always preferred by work personnel and tends to improve employee relations; and (4) a hot meal properly served is always more economical than cold servings of either dished foods or sandwiches.

Where means are available, it is most necessary that food be delivered to a gang's work site and, as mentioned earlier, in order to satisfactorily serve particularly hot meals, including hot and cold drinks, thermos equipment is essential. Several years ago, Western Pacific found suitable thermos equipment for this purpose and subsequently developed sanitary containers for bread, pastry, fruit, plates, cups, silver, etc., including an appropriate carrying case. This equipment has proven extremely economical in conserving man-hours and it has been accepted by the workmen as being most satisfactory. The saving produced by this equipment has more than compensated for the cost thereof in just the first year of use. A cursory glance at the man-hour savings realized through elimination of a gang traveling to and from assembly point at meal periods will readily show the economies of providing thermos equipment where kitchens are available to serve hot meals directly at job site.

At any rate, it can be readily adduced that Western Pacific is greatly interested in the man-hour savings made possible through this arrangement. I must say that we have been most successful in securing satisfactory equipment and having it accepted by our field forces. Since generally speaking, all workmen think alike in matters of this kind, and inasmuch as they have accepted it on Western Pacific, I can see no good reason why other carriers could not successfully adopt it also.

Track work during winter?

With today's modern power equipment, what factors, if any, rule out the feasibility of laying rail and renewing ties during the winter in the northern regions of the country? Explain.

Many winter problems

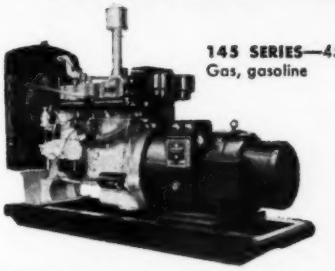
By G. W. MILLER
Regional Engineer
Canadian Pacific
Toronto, Ont.

Specialized problems relating to railway maintenance during winter months in the northern regions are largely confined to the period of from November 15 to April 1 each year. The main factor affecting the railways during this period of the year is "Old Man Winter" himself. Winter as the people in the north know, is approaching when temperatures drop followed by storms, drifting snow, and frost. Any one of these factors can prevent the efficient use of modern power equipment and labor outdoors where the work is exposed to the elements.

Power equipment is difficult to operate in sub-zero temperatures, hence delays to the work. Track materials such as bolts, spikes, tie plates, are quickly covered by a 2-in fall of snow which may occur without warning overnight in spite of good weather forecasts. Wind and drifting snow often cover the rail and prevent track-car movements. Heavy storms requir-

(*Continued on page* 46)

WAUKESHA



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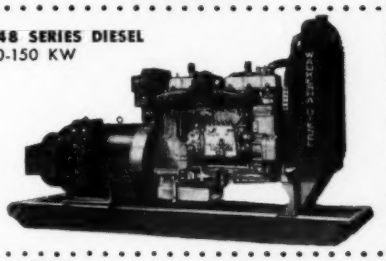

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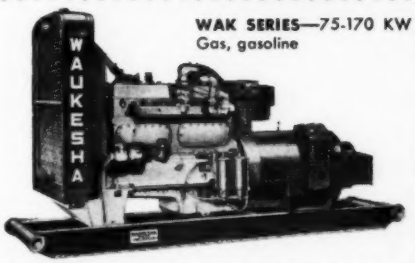

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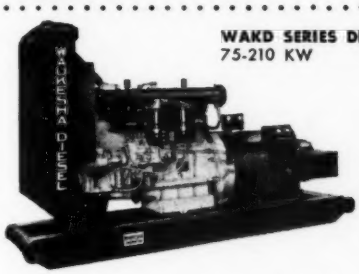

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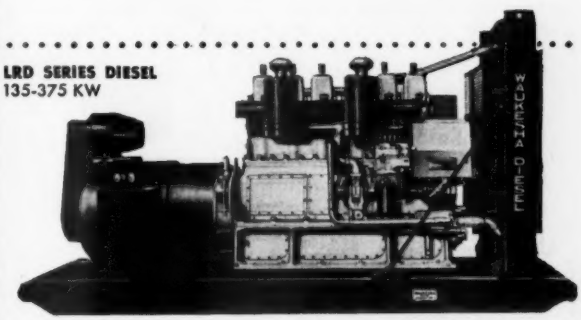

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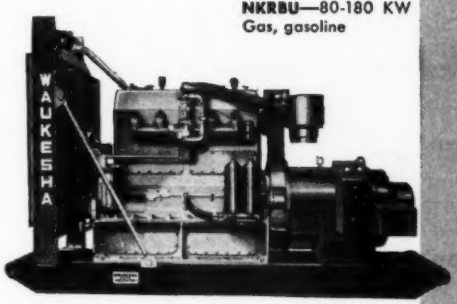

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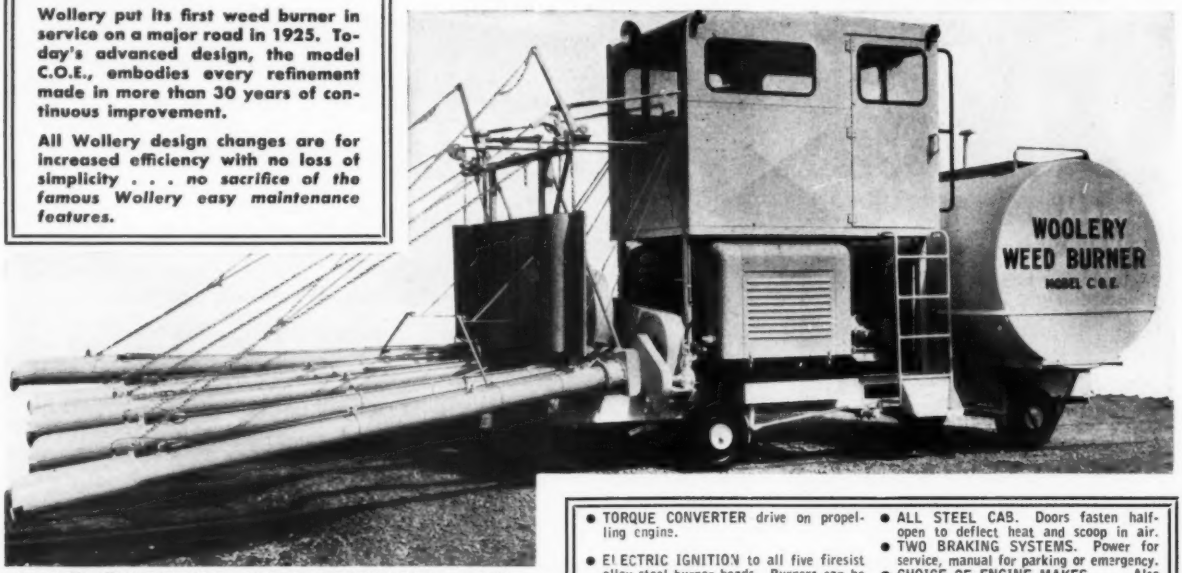

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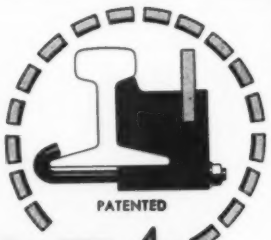

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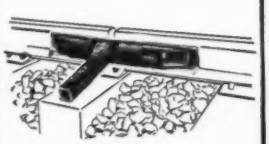

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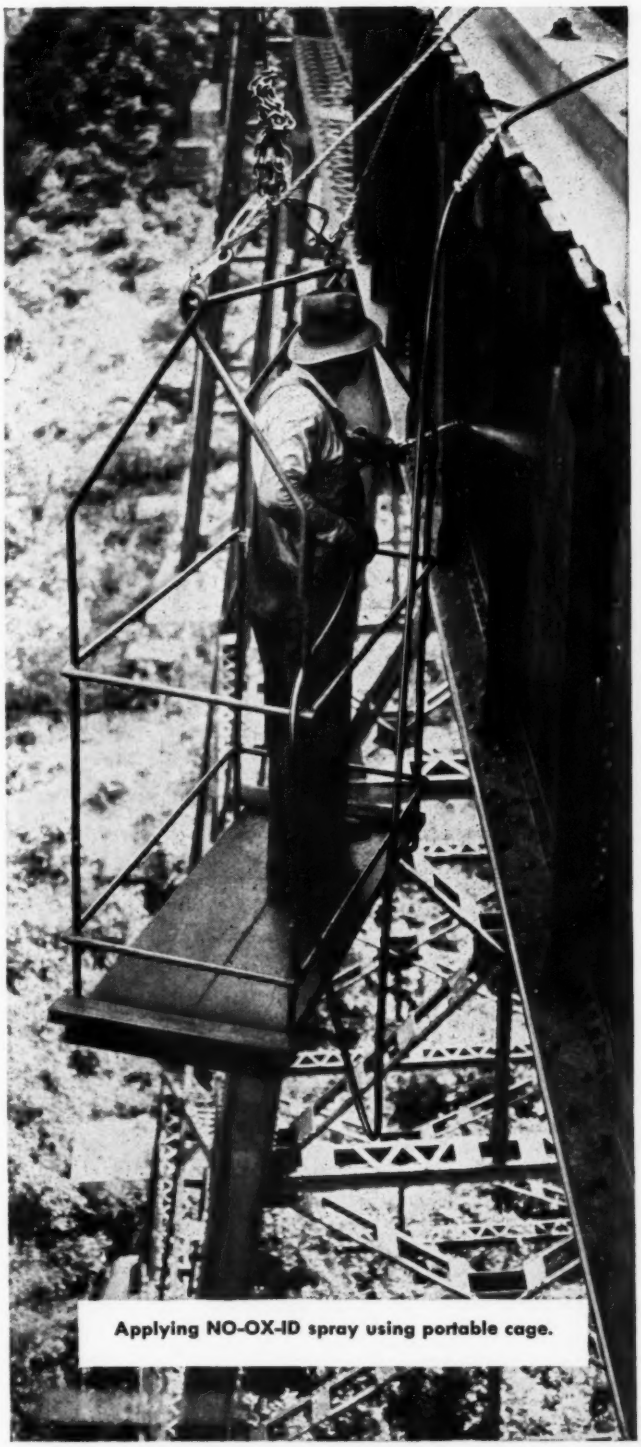

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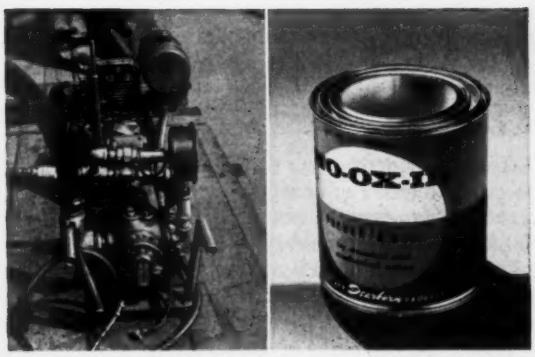

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ing movement of snow removal equipment may require key personnel to keep switches clean and to man the snow-fighting machines.

Tie renewals under winter conditions are entirely impractical where the ground freezes to a depth of 2 to 3 in or more. Tamping of ties for renewal or surfacing while snow is on the ground is not permissible except in case of emergency because the snow will melt in the spring leaving loose ties and a rough track condition.

Frozen ballast prevents work

By S. H. Barlow
Engineer of Track
Northern Pacific
St. Paul, Minn.

Today's modern power equipment on the Northern Pacific would be of no benefit in renewing ties or laying rail, including the necessary incidental work required in relaying operations, in the winter on the majority of our territory.

During the beginning of the winter snows, we have alternate freezing and thawing which fills the voids in crushed rock ballast with the ice resulting in frozen ballast for the duration of the winter.

This condition eliminates from an economic standpoint, the use of either hand labor or power equipment to renew ties as the ties are frozen to the tie bed and cannot be forced out through this frozen ballast without excessive labor costs.

A similar situation exists with the relaying operation as the tie crib must be partially skeletonized through the tie plate area in order to adze the ties to accommodate new and larger tie plates. Also, in order to protect the new rail from becoming surface bent, the track would have to be power-tamped or spot-tamped and this cannot be done due to the frozen ballast condition.

There is also the problem of snow removal before either of these operations could be accomplished.

The limited daylight working hours and extreme cold weather, ranging down to -63 deg F, do not permit efficient gang operation in the winter.

We understand that some of our neighboring roads do relay in the winter as the heavy traffic does not permit use of extra gangs during the summer period.

Relay rail in winter

By P. G. Martin
District Engineer
Union Pacific
Omaha, Neb.

On the Union Pacific in territory where winter weather conditions prevail, we do not renew ties, except in an emergency, because of the frozen condition of the roadbed which slows down the operation of removal to the extent that it is not economically feasible.

We do relay rail during the winter, however, and have found there is not too much difference in the operation between summer and winter. Laying of rail in the winter has one big advantage which is that of light traffic and very little delay to trains and relay gang. However, with frozen ground it requires approximately 30 extra men where the ballast is full to pick out the cribs as machine routers will not get all of the frozen ground. When laying rail in the winter you do not have swinging ties which are encountered in the summer, and what low ties there are can be shimmed up ahead of the placement of tie plates by use of a 20-ft straightedge.

The same organization is used on the relay gang winter and summer, with the exception of these 30 extra men. There is more hazard of personal injury in the winter due to ice, snow and frosty ties and ground.

During the last war, rail was laid all winter each year with temperatures from 10 to 15 deg below zero. A weed burner accompanied the gang and was used each morning to loosen the plates and small material which were frozen to the ground. However, this was not used every day—only in sub-zero weather. No extra help was required in the operation of the weed burner (such as an operator or helper) as there are plenty of qualified operators on the steel gang, and it only required about one hour. The bolts are a little more difficult to get through the joint packing than they are in the summer. A thermometer must be used all the time in the winter to get the right expansion in the rail ends.

Personally, I would rather lay rail in the winter than the summer so as to get it out of the way and have the summer free for other work.

I do not have any figures available, but I believe that laying rail in the winter is less expensive than in the summer due to savings in delays to trains and relay gang.

Avoid winter work

By L. G. Lawson
Roadmaster
Canadian National
Melville, Sask.

I have laid rail in all seasons of the year, both as extra gang foreman and as roadmaster, in temperatures of 100 deg in the summer and 40 deg below zero in the winter months. This has been done both with and without fully mechanized gangs.

First, we must consider the unloading of materials as compared to summer operations. In winter—even early winter—in these regions, one must always plan that there may be snow before the next morning. All planning must be on that basis.

Rails are unloaded the same as in summer months, as are angle or splice bars. Bolts, tie plugs, spikes, washers and rail anchors can also be unloaded the same as in summer, but must be distributed immediately ahead of the gang just for that day's work. Tie plates must be unloaded in piles on level ground where they will not become lost in the event of snow.

When setting up track fastenings for the relay gang, care must be taken to see that they are not distributed so as to become buried under snow and, if enough snow does fall to bury same, they should be set at regular intervals so that they can easily be found. Tie plates are set in piles of five every fifth tie so they can be easily seen. Gager plugs are set in bags at approximately each mile post. Tie plugs, in bundles of 500, are set 25 rails apart. Spikes where we usually use 75 per cent new spikes, are set in 200-lb kegs every 12½ rails apart. Bolts in 220-lb kegs, for six-hole splice bars, are set 16 rails apart. Washers should be split and set in containers of 100 at each bolt keg. Rail anchors are set in bags every three rails at locations where we use 16 anchors per rail.

A push car with two men is used just ahead of the men throwing out

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the old rail, to peddle the tie plugs, gager plugs, spikes, bolts and washers. The rail anchors are peddled with another push car with two men just behind the spiking machines.

First of all, it is often necessary, where there is snow to sweep with brooms, to find the spikes and rail anchors ahead of the gang. This requires one man on each side; these men are not necessary during the seasons with no snow. The spike pullers also are slightly slower due to slipping in snow. Bolting machines seem to operate about the same at all times. The taking off of the old rail anchors is easily done in summer with one man on each side, while it takes at least two during the winter. Cribbing is something that also has to be very carefully handled during winter operations, as it takes at least five men to each rail, picking ahead of the cribber.

Crossings must be picked out beforehand. This takes at least two men per day. Creosote application seems about the same, but spike driving requires four spikers, while in summer three will do the job. The application of rail anchors is about the same. The laying of tie plates, due to the fact that they are piled in piles of five instead of each one on a tie, takes five men whereas, in summer, three will do. The setting back of crossing planks also takes about 25 per cent more time in winter than in summer.

One of the biggest drawbacks to winter rail laying with mechanized gangs is that machines are much harder to start and parts break much more easily than in summer. Toes of spike pullers will not last half as long. The mechanics and machine operators must go out at least one hour ahead of the gangs to insure that all machines are working when the gang arrives. Otherwise much valuable time may be lost.

In picking up after the relay, care must be taken that all material is piled each night so it can be clearly seen by the work train, and must again be set at regular intervals so that, in case of heavy snow, the material released can be found.

I would state that machines are about 25 per cent less efficient, while men possibly work slightly harder in winter than they do during summer weather.

It is almost impossible to line newly laid rail and, as we try to line immediately ahead of or behind the relay gang, this is not possible during winter operations. In most cases, rail taken out is bent at the joints; hence the joints of the new rail have to be shimmed up at once to prevent damage to the rail. The following summer, the shims are taken out and the track surfaced. During summer operations the track is surfaced immediately after the rail is laid, saving a considerable amount in shims and additional work. Bolts also tighten better in the summer. Grease applied to bolts and joints has to be continually heated during cold weather and this is not necessary during summer.

Switches which are laid along with the relay or immediately after are installed at considerably greater expense in winter, due to the fact that ties must be moved. Even in rock ballast this takes considerably longer in winter.

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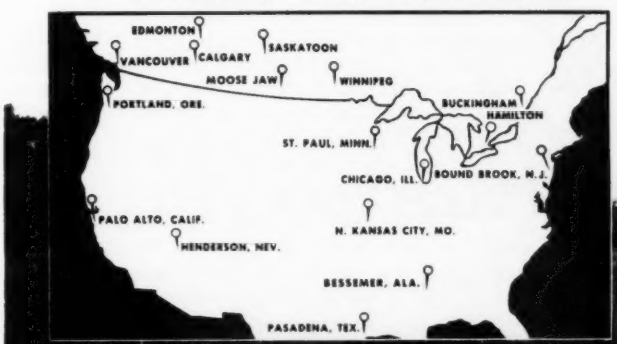

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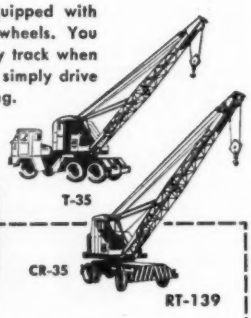

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What's the answer? (cont'd)

February, and eight hours during the months of December and January. Men seem far more liable to injuries during the snow period, which also adds to the cost.

As stated at the beginning, I have laid rail at every season and month of the year and, while it is not too bad during cold weather when there is no snow, I would state that the advantages of having men work during the slack period are greatly offset by the additional costs, personal injuries and poorer track conditions following a winter relay. From a cost and job performance standpoint, rail relays should be avoided from December 1 to March 1, at least in regions such as Canada and the northern United States.

Repair of branch-line culverts

What methods are most applicable to the repair of failing stone and concrete arch culverts on branch lines where economy in maintenance is a prime consideration? Explain.

No general rule

By L. P. Drew
Assistant Chief Engineer
Union Pacific
Omaha, Neb.

There can be no general rule or method adopted for the repair of masonry and concrete culverts since the size and condition at each location will determine to a considerable degree the most economical method to be used.

If the existing culvert has not collapsed and the opening is larger than necessary to handle the drainage so that some reduction can be made, it is usually most economical to thread a corrugated iron pipe through the existing opening and fill the voids between the pipe and the old culvert by blowing in sand or pumping grout.

If the old culvert has either completely or partially collapsed, it is usually most economical to install a new culvert at a higher elevation and abandon the old. On branch lines the

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installation of the culvert at higher elevation can usually be done by digging through the track on a day when trains are not being operated, placing the culvert and backfill all in one day.

In the case of large concrete boxes and stone masonry arches, the existing structure can usually be most economically repaired by pressure grouting. This method permits consolidation of the disintegrated concrete or masonry as well as solidifying the surrounding materials, which will reduce the surcharge to be carried.

Take each case separately

By W. S. Brown
Engineer Bridges & Buildings
Baltimore & Ohio
Baltimore, Md.

On the Baltimore & Ohio we have many stone arch culverts that are over 100 years old. The majority are still in good condition and have required a minimum of repairs during that time. A few have been thoroughly pressure grouted and appear to be good for many years to come. However, when repairs become necessary to masonry structures, it is difficult to set any definite methods of repair as each case has to be analyzed separately.

We must not lose sight of the fact that because of heavy taxes it is usually cheaper to repair an existing masonry structure than to go to the heavy expense of replacing it. This generally can be accomplished by setting up a schedule in order to have repairs made before deterioration has progressed to the point that repairs are not practical. To replace a structure requires capital expenditure money which is so heavily taxed that only about half is available for the improvement. If repairs are made with maintenance or operating money, we avoid the payment of these taxes and get the full value of the dollar.

There are three principal methods most applicable to the repair of failing stone and concrete arch culverts on branch lines where economy in maintenance is a prime consideration.

The first and probably the most economical method in the majority of cases is pressure grouting of stone arches and shotcreting of concrete arches. However, before any method is decided upon, a careful field inspection should be made. The condition of the foundation should receive the first consideration. If no visible signs of settlement or instability are observed under the movement of trains, and where the foundations are adequate and the masonry is of fair quality, the life of stone arch culverts can be greatly extended by pressure grouting. If the stone masonry throughout is of poor quality and scarcely able to carry the heavier loads of today without crushing, the expense of pressure grouting will not be warranted. In like manner where the foundations are adequate and not settling, repairs can be made to failing concrete arch culverts by shotcreting. Because of its density, waterproofing quality, and adhesion to old surfaces, reinforced shotcrete has long been recognized as a practical method of reconditioning old concrete.

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Without charge or obligation we'll make a complete inspection of your track to determine the exact need for reconditioning or replacement.

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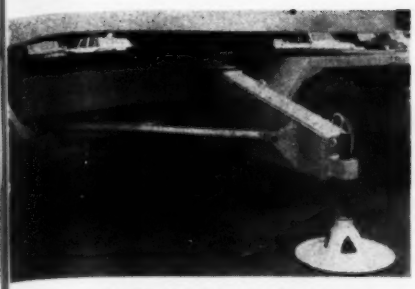
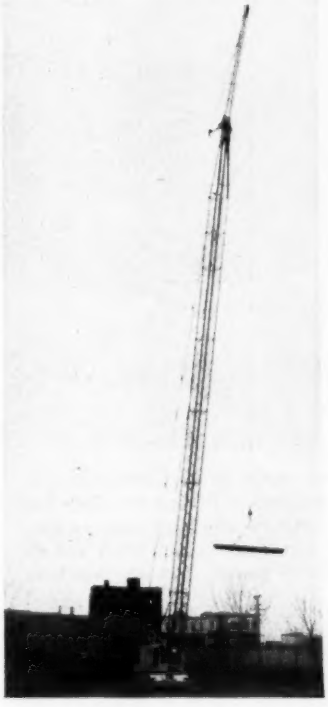
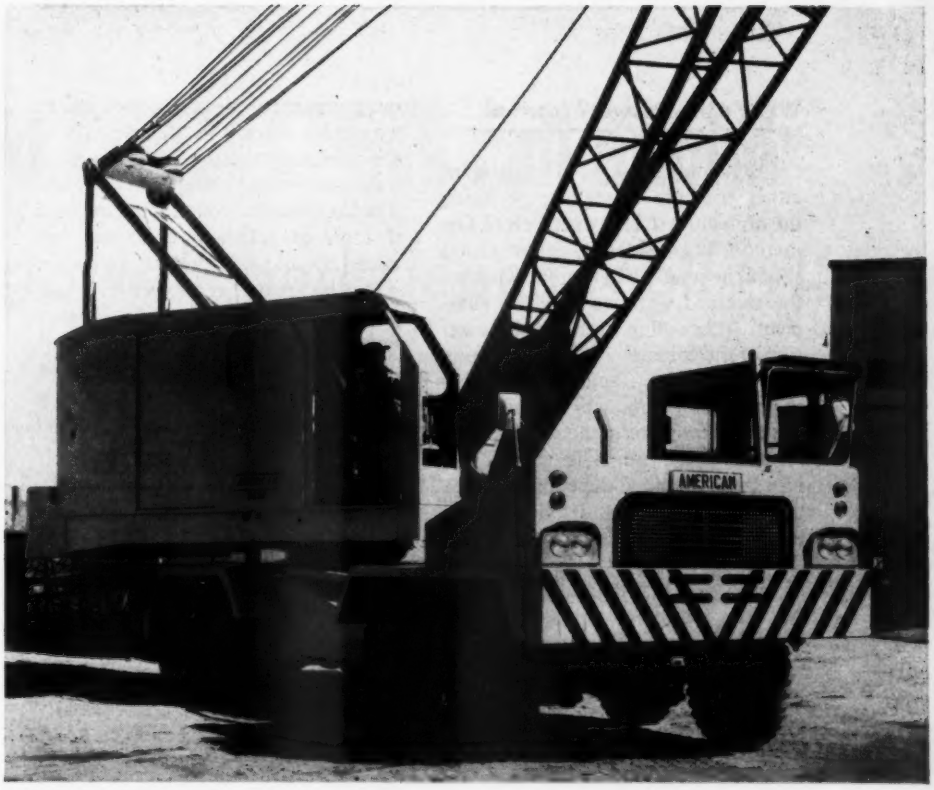


AMERICAN'S EXCLUSIVE outrigger system sets up quickly, easily. Screw jacks, with large suspended aluminum floats give you fast, safe blocking. By reducing frame stresses, this revolutionary concept in outrigger design results in a lighter weight carrier—allows use of stronger machinery deck equipment for heavy duty work. It provides a stable base for handling the longest boom, the biggest loads in its class. Only the 500 Series can swing rated loads safely through a full 360° arc!

CAPABLE OF PICKING UP 150 feet of boom and 30 feet of jib—180 feet in all—this new American Truck Crane demonstrates its amazing stability, balance and power! The rugged boom sections, strongest in the field, are a full four feet square. Only the 500 Series can handle so much boom—offer such great lifting capacities in its class.





ALL NEW . . . from exclusive swinging outriggers to the longest, strongest boom in its class . . . it's the American 500 Series Truck Crane. Revolutionary new features put this heavy duty 40-ton capacity crane far ahead in on-the-job versatility, performance and operating efficiency.

NEW AMERICAN 40-TON TRUCK CRANE STRIPS QUICKLY FOR HIGHWAY TRAVEL

When you examine the all-new 500 Series, you'll find it offers an unbeatable combination of strength, low overall height, lighter travel weight and the greatest lifting capacity—with the longest boom—in its field! You can strip this machine for highway travel in amazingly short time. Counterweight, outriggers and gantry are raised and lowered by the crane's engine. Pin connections speed boom section removal or addition. The powerful carrier spreads travel weight over four axles.

Mechanically, you'll find that the 500 Series offers such important advantages as specially designed graduated air controls that give positive clutch control from smooth, easy engagement to full pressure with finger tip effort . . . liberal use of anti-friction bearings—in swing rollers as well as deck machinery . . . individually removable shaft assemblies . . . new design machinery base featuring straight-through girders and integrally welded roller supports that offer maximum strength, minimum weight and accurate roller alignment . . . engine controlled load lowering . . . engine controlled boom lowering . . . retractable high gantry . . . plus countless other job-tested features that cut operating costs, boost efficiency and keep your jobs on schedule month after month. Your American Distributor will bring you detailed information, all the facts on this important addition to the big American Excavator and Crane line that offers capacities starting at ½-yard, 12½ tons and up!

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Special materials handling equipment

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EXCAVATORS-CRANES to 2 yds.-50 tons
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What's the answer? (cont'd)

desirable method is the installation of either concrete or metal pipe inside the arch culvert. However, before this method is considered, investigation should be made to determine whether the reduced waterway will be sufficient. Although in most cases the design of the original waterway opening allows an ample factor of safety so that a moderate reduction in area will not be a detriment to the safety of the repaired structure. The size of the pipe to be threaded depends upon the drainage area needs. In many cases the new pipe can be pulled through the failing arch culvert by means of ordinary block and tackle. Succeeding units are joined on as they enter the old structure. The space between the pipe and the failed arch culvert must be filled with earth, sand, or other suitable material. Methods for placing the backfill are sluicing, hand tamping, or air jet.

The third and final method of repair is lining by means of Multi-Plate arches. This method of installation consists of providing a footing or abutment for the arch plates, either by cutting a notch in the sidewalls of the existing structure or by building a narrow footing along each sidewall. The arch may be constructed in place if there is sufficient clearance between the old and new structure, or it may be erected at a lower level and jacked up into place or be erected outside the old structure and then jacked forward into place. Filling or grouting between the old and new structure is essential.

Biographical briefs

(*Continued from page* 10)

ton and in 1939 was promoted to division engineer at that location. From 1942 until 1949 he served as engineer maintenance of way of the Maine Central at Portland, Me., returning to the B&M in the latter year as chief engineer at Boston—the position he held at the time of his recent promotion.

Joseph R. Rymer, 30, who was recently promoted to division engineer of the Baltimore & Ohio at Chicago. (*RT&S,* Oct., p. 26), graduated from the University of Maryland and joined the B&O in July 1952 as a technical trainee. From August 1954 until June 1955 he served as assistant to the division engineer at Akron, Ohio. On the latter date he was appointed

Joseph R. Rymer
B&O

Albert E. Monaghan
CNR

maintenance inspector at Baltimore, Md. In October 1955 he was promoted to assistant division engineer at Akron and in May 1957 was named assistant trainmaster at Garrett, Ind., the position he held at the time of his recent promotion.

Albert E. Monaghan, 35, who was recently promoted to division engineer on the Canadian National at Capreol, Ont. (*RT&S,* Nov., p. 12), graduated from Nova Scotia Technical College and, after working summers in various capacities with the CNR and various highway, municipal and utility departments, was appointed instrumentman at Allandale, Ont., in 1949. In July 1952 he was named assistant engineer at Capreol and in April 1956 was promoted to senior assistant engineer. Since September 1956, he had been assigned to the operations training

(*Continued on page* 57)

Gangs of men are not needed to keep switches open when WHITE Gas Burning Switch Heaters are used. For 25 years they have proven to be the only snow melters which can effectively cope with maximum storms. There are no clogged switches with WHITE heaters. Also available with WHITE remote controls.

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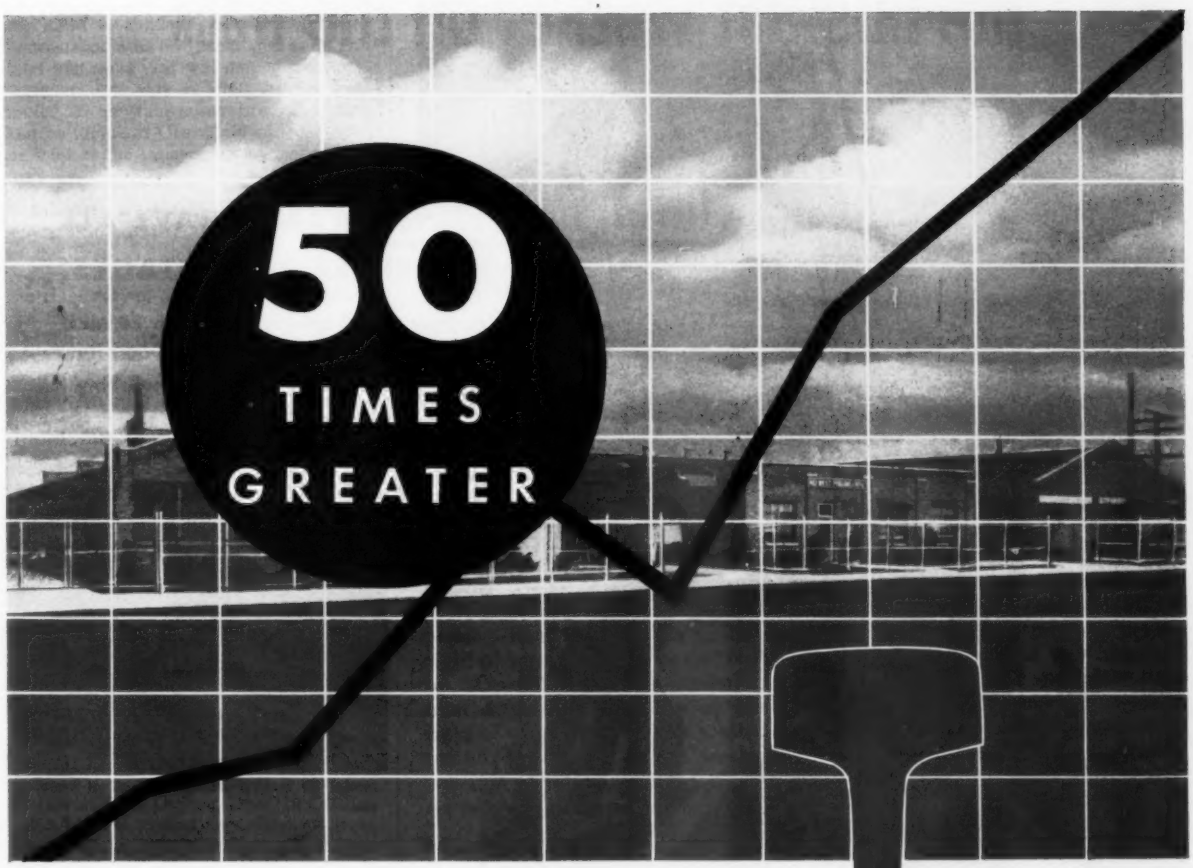
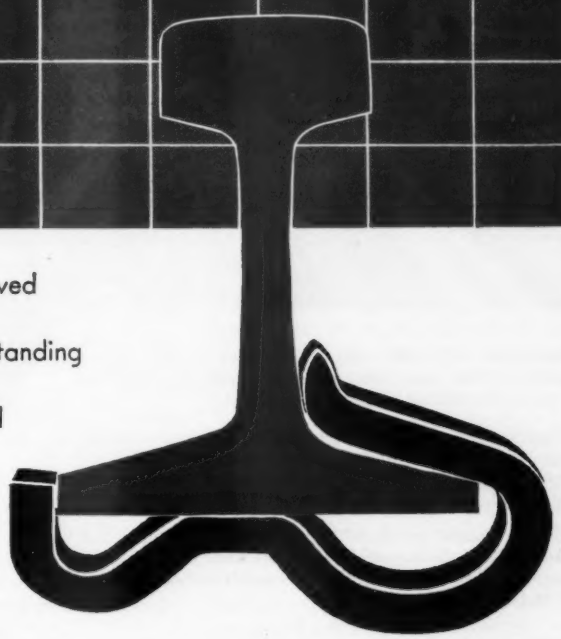
10 years of growth and dependability!



In 1957 there will be 50 times as many Improved Gautier Rail Anchors sold as in 1947*—this rapid growth is excellent testimony to the outstanding quality and dependability of the Gautier. Here is an anchor so carefully engineered and constructed before being put on the market that the original specifications, without variation in either design or material are being used today.

It is truly the finest Rail Anchor on the market.

** the year the Gautier was introduced.*



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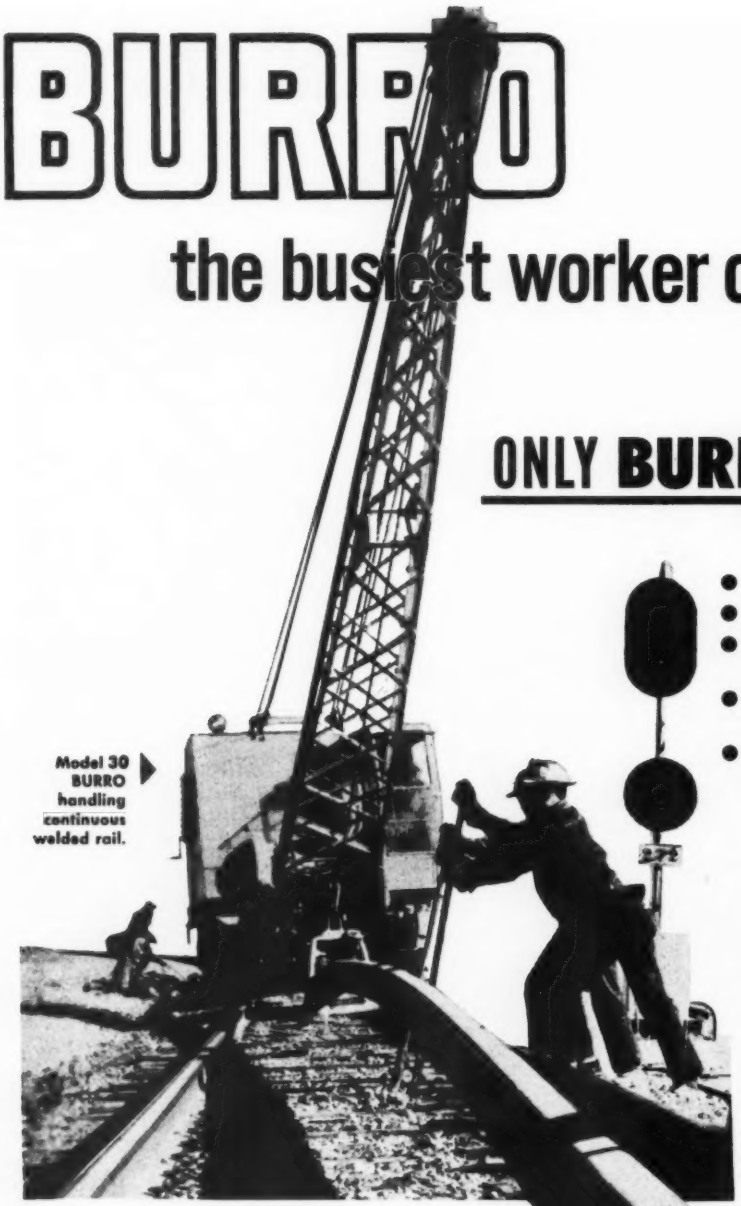

Model 30 BURRO handling continuous welded rail.

ONLY BURRO CRANES HAVE ALL THESE ADVANTAGES:

- Fast travel speeds . . . up to 28 MPH
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New track construction with a Model 30 BURRO is a fast, efficient operation.

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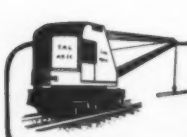
BURRO Cranes are made in three models—Model 15A, Model 30, and the larger Model 40. BURRO Crane catalogs have the full story on these time and money-saving machines. Write for them.



CULLEN-FRIESTEDT CO.

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Biographical briefs (cont'd)

plan of the Canadian National—in which capacity he was employed at the time of his recent promotion.

Roger U. Simpter, 36, who was recently promoted to supervisor of bridges and buildings on the Boston & Maine at Greenfield, Mass. (*RT&S*, Oct., p. 26), attended Dartmouth College and the Thayer School of Engineering and joined the B&M as a laborer in 1940. In 1946 he was appointed draftsman at Boston and later that same year was named structural designer. On May 1, 1948, he was promoted to assistant supervisor of bridges and buildings at Greenfield—the position he held at the time of his recent promotion.

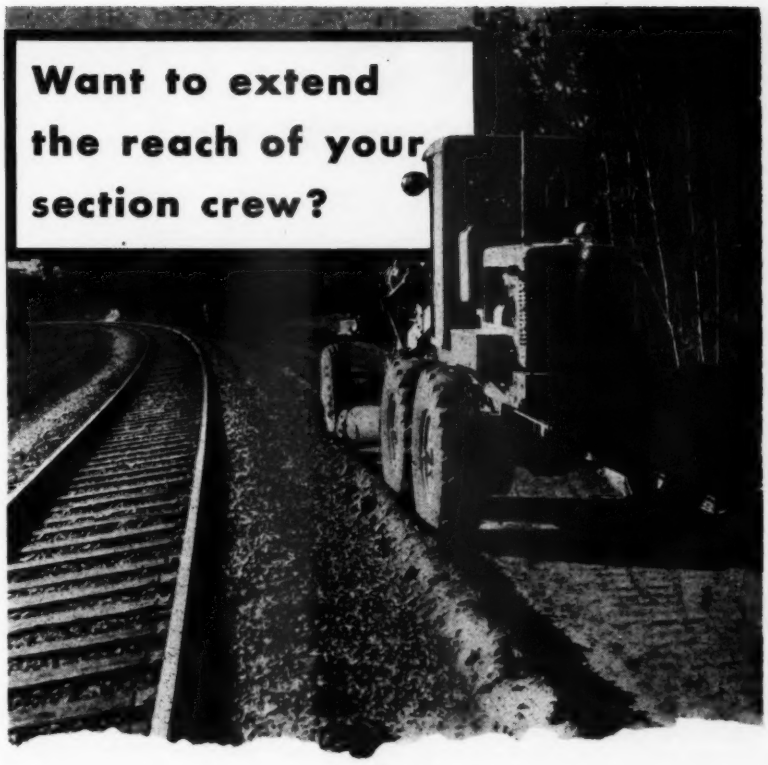
James L. Weatherby, 43, who was recently promoted to assistant chief engineer of the Texas & Pacific at Dallas (*RT&S*, Nov., p. 12), attended Texas A&M, and the University of Missouri and began railroading in September 1935 as an assistant signalman on the T&P. From September 1939 until June 1948 he served as signal draftsman at Dallas, except for the period from April 1943 to December 1945 when he served with the 748th Railway Operating Battalion. In July 1948 he was promoted to signal engineer at Dallas—the position he held at the time of his recent promotion.

Lewis D. Freeman, Jr., 34, who was recently promoted to assistant district engineer on the Pennsylvania at Pittsburgh, Pa. (*RT&S*, Nov., p. 12), graduated from the Virginia Military Institute and began railroading in August 1947 as an engineering apprentice on the Pennsylvania at Washington, D. C. After serving as assistant supervisor of track at Enola, Pa., and Lewistown, he was promoted to supervisor of track at Carnegie in June 1950. In June 1951 he was transferred to Erie and in July 1953 to Dayton, Ohio. In October 1954 he was named supervisor of track at New York—the position he held at the time of his recent promotion.

William J. Savage, 49, who was recently promoted to chief engineer of the Texas & Pacific at Dallas (*RT&S*, Nov., p. 12), graduated from Rice Institute and began railroading with the Missouri-Kansas-Texas in June 1928 as a bridge draftsman. The following year he joined the Missouri Pacific as a bridge inspector at St. Louis and worked on that road in varying capacities as inspector, bridge foreman, and assistant supervisor in the bridge depart-

L. D. Freeman, Jr.
PRR

James L. Weatherby
T&P



One man and a modern Adams* grader can extend the reach of your section crew by cutting expensive hand labor often spent on right-of-way maintenance and clean-up. Operating Adams grader, one man drives via highway or along right-of-way to take care of scattered maintenance work fast. There's no waiting to be transported by rail, no need for a special crew.

Versatile, fast-moving grader upon arrival at job site goes to work immediately, performs the following: 1. cuts and cleans ditches 2. slopes banks 3. widens shoulders 4. spreads ballast 5. levels fills 6. grades access roads 7. builds grade for siding 8. removes brush and growth 9. cleans up around water towers, coal docks, shops, stockpiles and yards.

By handling all these jobs with one man and a modern, high-speed Adams grader, your section crew can cover a larger area . . . spend more time on track and road-bed repairs . . . less time on right-of-way maintenance and clean-up.

Wide speed selection increases work capacity

Adams heavy-duty graders (80 to 150 hp) have a full range of 8 forward speeds . . . all the way from 1.3 to 26 mph. This wide speed selection means better matching of power to load, more efficient performance. Low end of speed range can be extended even further with optional "creeper" gears, which work at speeds down to 0.23 mph. These extra-slow speeds give you better control when turning up hard-packed sub-surfaces, roots, and stones. They provide extra lugging power in tough materials. And Adams high back-up speeds, to 13 mph, save time on shuttle-grading, reverse grading, and backing to buck deep drifts when plowing snow.

Ask us to show you an Adams grader at work. See for yourself the many ways it can help you produce more work, faster, at lower cost. There is a size Adams for every need: 60, 80, 115, 123, 150, 190 hp. Choice of GM or Cummins engine on 5 larger models. The 190 hp machine is equipped with torque converter.

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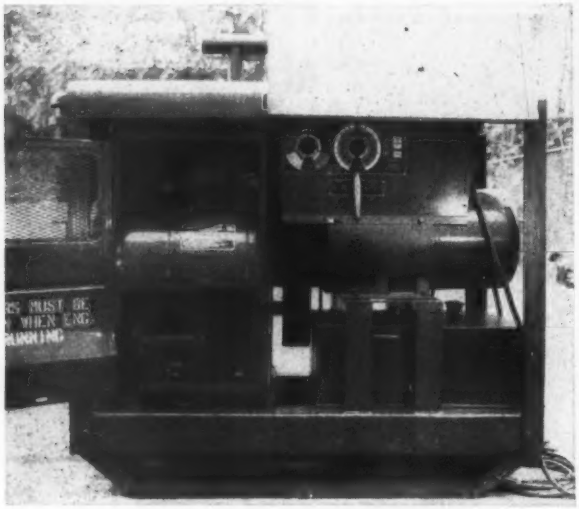
with only Minor Adjustments



with this 400 amp.
WISCONSIN-POWERED WELDER

On-the-job service is what counts most in an engine. Here, for example, is a brief summary of a service report covering the performance of the Model VR4D 56 hp. Wisconsin Heavy-Duty AIR-COOLED Power Unit which drives the 400 Ampere Arc Welder illustrated above:

"Has operated exceedingly well . . . approximately 3143 operating hours . . . maintenance has been negligible after a few minor adjustments; appreciate fact that servicing is so simple; we are free of anti-freeze . . . no fooling with gadgets of water-cooled engines."

This is another typical case of outstanding service delivered by Wisconsin Heavy-Duty Air-Cooled Engines on many kinds of equipment. Basic load-holding High Torque, heavy-duty design and construction in all details, foolproof all-weather Air-Cooling and *exclusive specialization* in the design and manufacture of AIR-COOLED Engines are some of the factors that are responsible for Wisconsin Engine preference wherever dependable, economical power is required.

You can't do better than to specify "Wisconsin Power" for your equipment. Write for Wisconsin Engine Bulletin S-212.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
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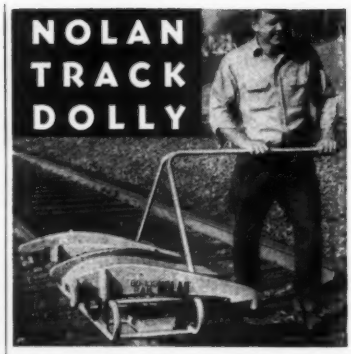

. . . the fast, safe, easy way to transport materials

You can get rails, ties, supplies, tools, rerailers, etc., to the job with money-saving speed and efficiency, when you equip your crews with the Nolan Track Dolly.

Built of tubular high-carbon steel. Extremely strong and serviceable. Operator's handle conveniently placed to assure correct balance and full control of heavy loads. Ball bearing cast steel wheels. Convenient spike securely holds dolly in loading position. Deck is heavy mesh expanded steel.

STANDARD DOLLY				INSPECTOR'S DOLLY			
Length	Width	Ht. Above Rail	Weight	Length	Width	Ht. Above Rail	Weight
50½ in.	15½ in.	6⅝ in.	88 lbs.	36 in.	14 in.	6 in.	60 lbs.

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NOLAN TOOL AND SUPPLY CAR

2000 lbs. capacity. All-tubular high-carbon steel construction for safe carrying of ties, rails, supplies, etc. Car breaks conveniently in center into two sections for easy handling and transportation. Deck is heavy mesh expanded steel.

Platform size 48" x 45" Ht. above rail 8" Weight 140 lbs. complete.

Write for complete railway supply catalog.

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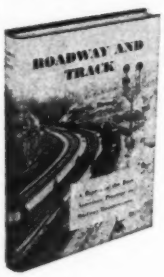

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The standard authority on maintenance of railroad tracks, roadbeds, and rights-of-way: not only required reading for maintenance men, but of value to transportation and operating officials who must know the fundamentals of this important phase of railway work. The use of mechanical equipment in roadway and track maintenance is covered in full detail. Methods used where mechanical equipment is not available are described. 1946. 3rd ed. 350 p. 132 il. 12 tables. 6 x 9. cloth. $5.50

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Biographical briefs (cont'd)

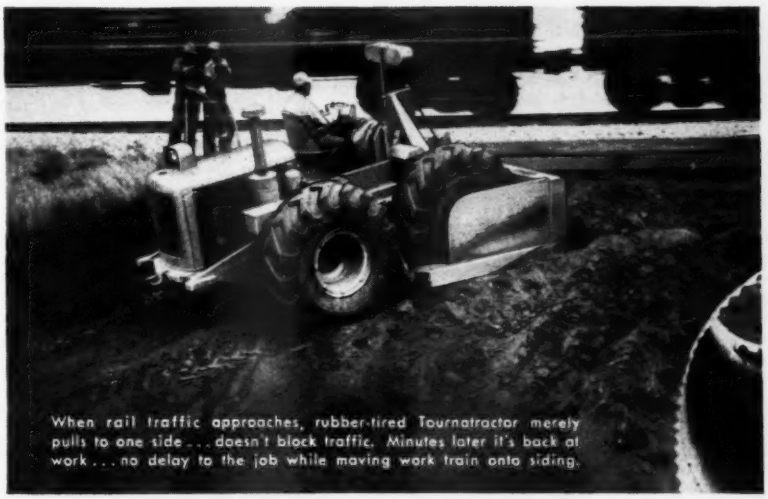
ment until May 1942. After serving with the U. S. Army during World War II as lieutenant-colonel with the 330th Engineer Regiment he returned to the Missouri Pacific in July 1945 as an assistant engineer, working on various track construction projects handled out of St. Louis. In July 1948 he accepted the position of assistant chief engineer of the Texas & Pacific—the position he held at the time of his recent promotion.

F. W. Biltz, 65, who recently retired as chief engineer of the Reading (*RT&S*, Oct., p. 26), graduated from Lafayette College and began railroading with the Reading in June 1917 as a levelman at Philadelphia. After serving as assistant supervisor of track at Tamaqua, Pa., he served in World War I as a first lieutenant in the transportation corps of engineers, AEF, returning to the Reading in 1919 to his former position at Tamaqua. After serving as assistant supervisor at Reading and at Trenton Junction, N. J., he was promoted to supervisor of track at Olney, Pa., in July 1922. After serving as supervisor at Mahonoy Plane, Pottsville and Pottstown, Pa. he was promoted to assistant division engineer at Reading in September 1934. In September 1936 he was named assistant to the general superintendent at Reading and in January 1941 was named engineer maintenance of way. In August 1943 he was furloughed for military service in World War II and served as colonel, Transportation Corps., commanding the 712th railway operating battalion. During December 1943 and January 1944 he was on detached service serving as assistant regional director, Eastern Region, New York Central, for control and operation of the U. S. railroads by the Army. In January 1946 he returned from military service to the position of assistant chief engineer at Philadelphia. Mr. Biltz was named chief engineer of the Reading on March 1, 1954.

William T. Van Deventer, 33, who was recently promoted to division engineer on the Canadian National at The Pas, Man. (*RT&S*, Oct., p. 26), graduated from the University of Manitoba and began railroading in February 1943 as a brakeman on the Canadian National. In May 1951, after attending the University of Manitoba and serving with the Royal Canadian Air Force, he was named instrumentman on the Portage Brandon division. After serving as resident engineer, junior assist-

Frederick W. Biltz
Reading

William J. Savage
T&P



When rail traffic approaches, rubber-tired Tournatractor merely pulls to one side . . . doesn't block traffic. Minutes later it's back at work . . . no delay to the job while moving work train onto siding.

How to handle scattered RR maintenance jobs

FASTER . . . CHEAPER

Handle your scattered RR maintenance jobs faster . . . more economically . . . with only one man and a high-speed, rubber-tired Tournatractor®. This versatile LeTourneau-Westinghouse tractor travels the *quickest* route to any assignment — at speeds to 17 mph — over tracks, roads, cross-country, or right-of-ways. Big, low-pressure tires flex harmlessly over obstacles . . . do not damage rails, switches, or ties.

Makes right-of-way repairs before damage gets serious

210 hp Tournatractor handles your right-of-way maintenance fast . . . makes repairs before damage becomes serious. Equipped with dozer or Angledozer®, this tractor improves drainage, replaces eroded fills, repairs shoulders, cuts down banks, reinforces causeways and bridge approaches. One man, with a Tournatractor, can keep many miles of your line in tip-top shape for less than it used to cost to repair one major wash-out. Tournatractor needs no work train or crews . . . doesn't delay rail traffic . . . easily drives off right-of-way at approach of train.

Handles variety of jobs

Tournatractor is also a profitable tool for stockpiling coal, cinders or ballast. Big, low-pressure tires compact and seal coal piles against spontaneous combustion. This versatile tractor-on-rubber also builds sidings . . . push-loads scrapers . . . pulls scrapers, other heavy equipment . . . plows snow, and spots railroad cars.

For complete information

Why not investigate the high-speed L-W Tournatractor? Its off-track mobility and versatility can make important time and money savings for your line. Call or write for complete details.

SwitchTractor* — a standard 210 hp Tournatractor, equipped with Type E railway car coupler on the rear — handles scattered switching duties fast. This off-track switcher drives directly across yards, fields, ditches, for quick spotting, grouping of cars. SwitchTractor's big, rubber-tired wheels straddle rails, ride on ballast and tie-ends. Tires give 60 percent coefficient of friction—*double* the tractive effort of steel-wheeled switchers rolling on smooth, steel rails.

*Trademark CT-1810-RR-3/5

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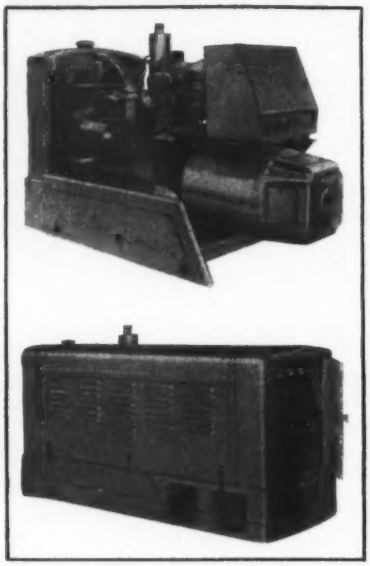

Onan develops new low-cost standby plants

Water-cooled units in 10 and 15 KW sizes meet rigid requirements

A new series of water-cooled electric plants makes Onan reliability and advantages available at significantly lower prices. The new units are powered by the same rugged, industrial-type engines used on more expensive plants. They have close inherent voltage regulation, operate on either gas or gasoline, and are equipped with all necessary controls and instruments, and high water temperature cut-off. Standard Onan accessories are available.

The Onan revolving armature, all-climate generator is direct-connected and self-aligning. All standard voltages are available. Both sizes are offered unhoused or with handsome weatherproof steel housings.

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Biographical briefs (cont'd)

ant engineer, and assistant engineer, he was, in March 1956, appointed engineer on the Terminal Performance Committee at Winnipeg, Man.—the position he held at the time of his recent promotion.

Association News

American Railway Engineering Association

The following committees have announced that they will hold meetings during the month of January: Committee 6—Buildings, January 16-17, Hotel Peabody, Memphis, Tenn.; Committee 11—Records and Accounts, January 21-22; Committee 14—Yards and Terminals, January 20-21, Lord Baltimore Hotel, Baltimore, Md.; Committee 16—Economics of Railway Location and Operation, January 29-30, Penn-Sheraton Hotel, Pittsburgh, Pa.; Committee 22—Economics of Railway Labor, January 20, Jung Hotel, New Orleans, La.; Committee 27—Maintenance of Way Work Equipment, January 20-21, Hamlet, N. C.; and, Committee 29—Waterproofing, January 22-23, Purdue University, Lafayette, Ind.

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Lower installation and maintenance costs—handle more cars better. Foster nationwide warehouses also stock every New Rail Section 12# through 175#, Switch Material and Accessories to meet your specific job requirements.

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L B FOSTER

Maintenance of Way Club of Chicago

The next meeting of the club will be held on January 27 at the Hamilton Hotel. The evening's speaker will be Col. J. B. W. Corey, district engineer, U. S. Army Corps of Engineers. Col. Corey will speak on the Cal-Sag channel project and the general effect of waterways on Chicago development.

Northwest Maintenance of Way Club

The January meeting of the club will be held on the 23rd and will feature an address by Ray McBrian, AREA president and director of research, D&RGW. The subject of Mr. McBrian's talk will be: "Atomic Era—How It Will Affect Railroads." As usual, the meeting will be held at the Midway Civic Club, St. Paul.

Supply Trade News

BIRD & SON, INC.—A new Industrial Sales Division has been established for the marketing of this company's products to manufacturing companies, railroads, institutions and service industries. General manager of the newly created division will be **Bertyl V. Johnson,** who leaves the sales department of the Floor Covering Division to assume the new post. Mr. Johnson will report directly to **A. H. Anderson,** president of Bird & Son.

The Industrial Sales Division has been set up to market all of the Bird products which have a direct application to the industrial field. These products include railroad tie pads and tie caulking. Sales of the products of the Railroad Tie Pad Division will be under the Industrial Sales Division and will be headed, as in the past, by **A. A. Cross.**

A. M. BYERS—**Harry E. Thompson,** field service engineer, has been promoted to New England division manager, succeeding **J. J. Merrill** who has been named Philadelphia division manager, succeeding **E. L. MacWhorter,** who has retired.

DUFF-NORTON—**Robert J. Beck** has been appointed assistant chief engineer of the firm's jack division at Pittsburgh.

GEIGY CHEMICAL—**Leo Miles** has joined Geigy Agricultural Chemicals, division of the Geigy Chemical Corporation, as Simazin industrial sales specialist.

HOMELITE—The firm, a division of **Textron, Inc.,** has formally opened its new chain saw production-line factory at Gastonia, N. C.

LEWIS BOLT & NUT CO.—**Meyer Paper,** president of this company, has announced the appointment of **E. T. Brown** as vice-president.

Burlington Route

MOVIES

Another cost-saving use of MANNIX Ballast Sled. A film showing the Burlington's use of the sled to raise new tracks in Cicero Yard is available for personal presentation. Write or call for particulars.

Save more track costs this year

The improved MANNIX Ballast Sled with hydraulic controls enables fewer men to do a better ballast reconditioning job faster than ever. This is efficient cost-cutting which a lengthening list of leading railroads is enjoying. Write, phone, or wire for full details of our special rental plan for the patented MANNIX Sled and Plow, available for working either single or double track.

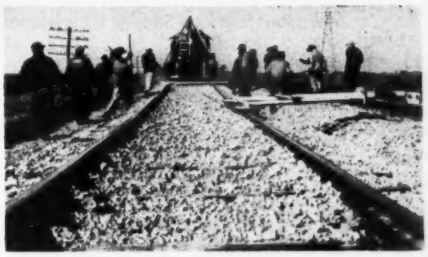
Every phase of rehabilitation is speeded up, made easier, with this job-proven MANNIX Sled/Plow team . . . skeletonizing, raising, renewing ballast and ties. An average of a mile a day is routine MANNIX performance.

MANNIX INTERNATIONAL INC.

4020 Minnetonka Boulevard, Minneapolis 16, Minnesota
Phone: WAlnut 7-9411

Reconditioning operation begins with jacking up of rails and ties and shoving sled into place beneath track.

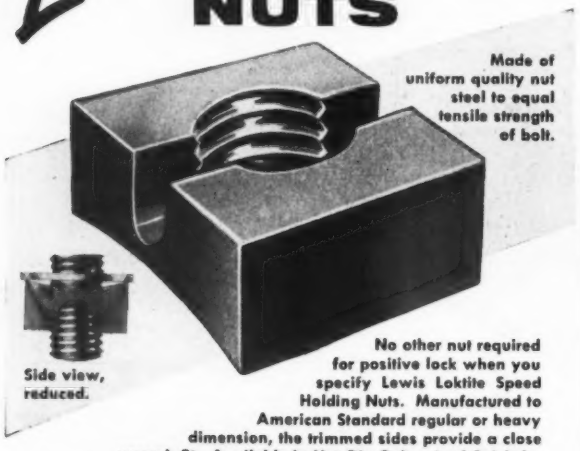
Coupled to a locomotive by cables, sled is pulled along beneath track, skeletonizing track and redistributing ballast in a single operation.



First pass of sled raises track about 4 inches, facilitating tie renewals. After ballast redistribution a second pass gives an additional 4-inch lift. Finally, track settles back on renewed roadbed.

FOR POSITIVE LOCK USE

Lewis LOKTITE NUTS



Made of uniform quality nut steel to equal tensile strength of bolt.

Side view, reduced.

No other nut required for positive lock when you specify Lewis Loktite Speed Holding Nuts. Manufactured to American Standard regular or heavy dimension, the trimmed sides provide a close wrench fit. Available in Hot-Dip Galvanized finish for Double-Life, greater economy, in black for low original cost. Call, wire or write for samples, prices.

All products are manufactured in the U.S.A. to A.S.T.M. specifications.

Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY

Q AND C CLAMPS ASSURE SAFETY

Q and C Universal type Guard Rail Clamps have sturdy yokes of drop forged heat treated steel, designed of "I" beam construction to insure extra strength and holding power.
One size of yoke is suitable for a range of rail sections which simplifies and reduces your inventory.

Order now for early delivery.

THE Q AND C CO.

59 E. Van Buren St. Chicago 5 | 90 West St. New York 6 | 611 Olive St. St. Louis 1

Our 71st year in the development of worthwhile track appliances.

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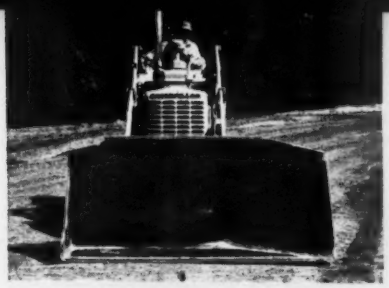
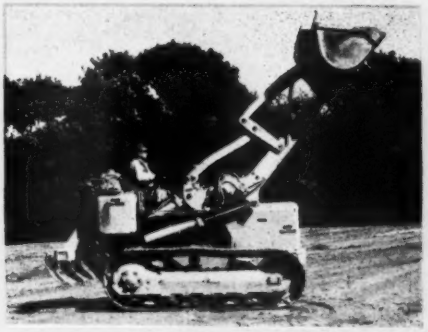
Here  comes...

the TRAXCAVATOR'S  new...

SIDE DUMP BUCKET!

—Directly interchangeable with standard bucket...same pins, bolts and nuts!

—Easy to operate! Dumps to the left as well as forward!

Now the famed Cat-built No. 955 and No. 933 Traxcavators are more versatile than ever! The new Side Dump Bucket attachment gives you

- Higher production, because cycle time can be cut
- Lower maintenance, greatly reduced ground scuffing, because turning when loading is no longer necessary
- Easier handling because the unit now needs less space for loading and truck spotting.

And you retain all the regular Traxcavator's popular features. Lockout-kickout, bucket positioner, 40-degree tilt-back, one-hand bucket control. No interference, either, with other Traxcavator* attachments when you equip with the new CAT* Side Dump Bucket. Get complete details from your Caterpillar Dealer *now!*

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Side Dump Buckets Available for the No. 955 and No. 933 Traxcavators!

	No. 955	No. 933
Bucket capacity	1⅜ cu. yd.	1⅛ cu. yd.
Overall width of bucket	96"	86⅜"
Overall height, side dump	17' 5½"	15' 6 1/16"
Overall height, level	14' 6"	12' 11 1/16"
Left side dump reach	24½"	25½"

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

A NEW DIMENSION IN LOADER VERSATILITY

RACINE
Hydra-Quad TAMPER
(Patent Pending)

Just one man operates this four-tool ballast tamper

Here's a completely hydraulic machine that tamps more track per man per day . . . and does it more uniformly. One operator controls the vertical movement and lateral position of four tampers through two finger-tip hydraulic valves. *Each tamping gun acts independently to insure full compactness of ballast at all points.* All four tamping guns automatically tilt to carry ballast under the tie at proper depth. To accommodate crooked ties, the operator simply swivels the main head.

The Hydra-Quad tamper is easy to adjust for varying rail heights and wider-than-average ties. Each gun is equipped with a quick-change tamping bar holder.

Drop-down and outboard wheels insure easy removal from track. Hydraulic cylinder raises and pivots the machine. Power winch assists in rerailing. Movement from tie to tie is powered by a fluid motor that also operates the power winch.

One more flexibility feature: Off-center outrigger mounting permits two men to operate machines on opposite rails to tamp both tie ends simultaneously. Send for free folder and specifications. Address **RACINE HYDRAULICS & MACHINERY, INC.,** 2038 Albert St., Racine, Wisconsin.

Lease or time purchase plans are available.

RACINE

HYDRAULICS & MACHINERY, INC., RACINE, WISCONSIN